

Vol. 22, No. 1
January - March 1999

ISSN 0253-4901

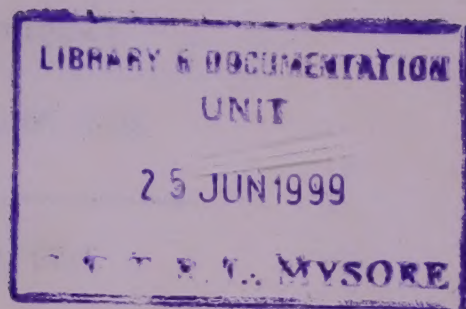
FOOD DIGEST



Central Food Technological Research Institute, Mysore
National Information System for Science and Technology
Department of Scientific and Industrial Research, New Delhi

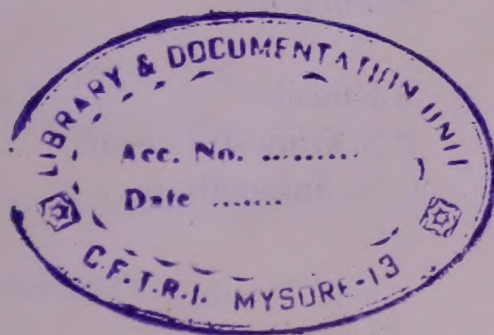
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FOOD DIGEST



Vol. 22, No. 1
Jan. – March 1999

217



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Annual Subscription: Rs. 300.00, US\$ 70.00, Single copy: Rs. 80.00

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RAW MATERIALS

1 Enriched beta-carotene tomatoes

The US Agriculture Department scientists have released three new lines of tomatoes that contain 10 to 25 times more beta carotene than average tomatoes. The new tomatoes can be processed into paste, juices and sauces.

"High beta carotene cherry and beefsteak type market tomatoes also will be released as speciality tomatoes for the fresh market. Soon consumers may be able to get abundant beta carotene not only from carrots but also from tomatoes," said Mr. John R. Stommel, Plant Geneticist, Agricultural Research Service's vegetable laboratory in Beltsville, Maryland. Mr. Stommel developed the new tomato lines.

Beta carotene provides the body with Vitamin A, an essential nutrient that aids in clear vision, bone growth, tooth development and reproduction. A major food producer already has begun using the breeding lines to develop nutritionally enhanced products, Mr. Stommel said.

Two of the three lines are best adapted to growing conditions in California, the East and the midwest.

The fruits are firm and crack-resistant. Tomatoes that split before harvesting are susceptible to fruit rot, which can cause large crop losses.

(*Business Line*, 7 November 1998, 21)

2 Headway in genetically engineered rice

Indian scientists are genetically engineering rice to make it tolerant to adverse environment conditions and resist attacks by pathogens. Reports presented at the 86th Indian Science Congress in Chennai point to several advances made in genetic engineering of rice by researchers.

A team led by S.K. Sopory from the International Centre for genetic Engineering and Biotechnology (ICGEB) in Delhi has identified two key genes that help plants withstand stress and regulate growth.

One is the glyoxalase-1 gene isolated from mustard (*Brassica juncea*) which helps plants combat stress and has been successfully introduced first in tobacco and later in rice by Sopory's colleagues at ICGEB.

Sopory reported that introduction of the gene into plants made them tolerant to excess salt conditions. India has considerable stretches of saline lands that are unproductive. Studies by his team have shown that the gene also makes plants tolerant to excess zinc in the soil.

"This is the first time it has been shown that glyoxalase-1 gene in transgenic plants gives tolerance against stress," Sopory reported. His team also successfully introduced in tobacco a gene that regulates plant

growth and development. The gene isolated from *Entamoeba histolytica* codes for a protein that specifically binds with calcium.

Tobacco plants genetically engineered to contain this gene produced a lot of chlorophyll- the key pigment involved in photosynthesis, the process by which plants make food from water and carbon dioxide in the presence of light. The advance could ultimately hold key to improving crop productivity. The gene coding for the calcium-binding protein also delayed senescence in plants, Sopory reported. (PTI Science Service, Jan 16-31, 1999, 2)

STORAGE AND INFESTATION CONTROL

3 Improperly stored cereals can cause food-borne diseases

Food scientists have warned against the use of improperly stored cereals, especially maize and sorghum, in which exceedingly high amounts of fungal toxins have been found.

The National Institute of Nutrition (NIN) in Hyderabad analysed 157 food samples made from normal maize and sorghum, and rain-affected cereals for toxic compounds.

The NIN study found that all samples of rain soaked maize and sorghum showed very high amounts of toxins, like fumonisin B1 and aflatoxin

B1, which are associated with abdominal pain, diarrhoea and liver diseases in humans. .

About 74 per cent of the normal maize and 4.5 per cent of normal sorghum contained fumonisin B1, while aflatoxin B1 was present in 88 per cent of maize and 23 per cent of sorghum samples, Ramesh Bhat and colleague P H Shetty reported.

Fumonisin, produced by the fungus *Fusarium*, are a group of recently discovered toxins. Though a number of fumonisins are reported, fumonisin B1, B2 and B3 occur naturally in food. Of these, fumonisin B1 is found predominantly in cereals, especially maize, in low and variable amounts. When harvested grains are exposed to rains or stored improperly, there is a sharp increase in fumonisin levels.

Consuming food items prepared from contaminated cereals adversely affects liver and kidneys, resulting in disease outbreaks.

Fumonisin B1 is listed as "potential cancer-causing" agent by the International Agency for Research on Cancer (IARC). Besides, it is known to cause weight loss and diarrhoea, and affects bone formation in animals.

As cooking does not reduce toxicity of these compounds, the report stresses the need to minimise fungal infections in farms and evolve better

post-harvest strategy to curtail its spread.

Laboratory tests carried out by NIN scientists on cereals infected with *Fusarium* showed that it takes about seven to nine weeks for fumonisin B1 to reach maximum levels. The highest accumulation was found in maize followed by rice, sorghum and wheat. The study found that consumption of fungus-infected maize, which is an important ingredient of animal feed, severely affects poultry production and increases the rates of animal mortality.

While administration of antibiotics and vitamin supplements did not help the affected animals, withdrawal of the infected feed led to improvement in disease symptoms. The researchers suggest soaking maize seeds in 30 per cent sodium chloride solution to effectively weed out contaminated seeds.

(PTI Science Service, 17(20), 1998, 5-6)

PROCESSES

4 Process for preparing a potato product having an extended hold time

Manufacture of a potato product which retains a crisp outer surface texture is described. This product consists of potato pieces covered in a coating containing corn starch, corn flour and low solubility dextrin. In a preferred embodiment the coating also contains rice flour.

NaCl and sodium acid pyrophosphate. The manufacturing process consists of washing, cutting and blanching the raw potato, partially drying the surfaces of the cut potatoes, applying an aqueous starch-based slurry mixture to the potatoes and part frying and freezing the coated potatoes.

(Trends in Food Science and Technology, May 1998, 216)

5 Process for extraction of a natural anti-oxidant from coffee beans

A process is described for extraction of a natural antioxidant from coffee beans, based on: grinding the coffee beans; soaking the ground coffee beans; solvent extraction of the antioxidant; filtration; purification of the antioxidant extract on activated carbon; evaporation of solvent residues; and drying.

(Trends in Food Science and Technology, May 1998, 215)

6 Process for manufacture of popped cereal products enriched with vitamins, minerals and/ or trace elements

A process for enrichment of popped cereal products, especially popcorn, with minerals and vitamins based on preparation of a mixture of minerals and vitamins in a suitable carrier, and popping of a mix of cereal grains and this nutrient supplement for 1-5 min at 130-280° C or in a microwave oven at 400- 1500 W. At

least a large proportion of the nutrient supplement is absorbed by the popcorn.

{Trends in Food Science and Technology, May 1998, 215}

7 Process for manufacturing dehydrated instant-noodles

A process for manufacturing dried instant noodle products is described. Noodle dough strands, which have been previously steamed or boiled, are transported on a net conveyor and dried using air, inert gas (e.g. N₂, He or CO₂) or a mixture of both at 100-200° C. The gas mixture is supplied at high speed from a separate high-pressure compartment through spray nozzles positioned above and below the net conveyor. This process enables rapid expansion and drying of the layers of noodles.

{Trends in Food Science and Technology, May 1998, 216}

8 Natural style fruit syrups

A process is described for manufacture of concentrated fruit syrups (for use in preparation of beverages) by natural extraction of a fruit/ sugar mixture exposed to sunlight in a container. The process is especially suitable for manufacture of blackcurrant, raspberry, cherry and redcurrant syrups.

{Trends in Food Science and Technology, May 1998, 215}

BY PRODUCTS AND WASTE UTILIZATION

9 By products from food processing wastes

Fruit	% Waste	Nature of waste	Byproduct
Mango	27-50	Peels, stones, pulping waste	Starch, fat, pectin, vinegar, syrup, alcoholic beverage
Pine apple	50-60	Peels, cores, trimmings	Vinegar, syrup, citric acid, candied cores
Grapes	5-10	Stem, seeds, seed hulls	Cream of tartar, seed oil tannin, vinegar, pectins, wines, stock seed
Apple	60-70	Pomace, Cores cull	Pectin cider, vinegar, soft drink jelly base
Citrus	50	Peels, pomace, seeds	Pectin, essential oil and seed oil
Peaches apricots and cherries	-	Piths, kernels	Oil, stock feed

{Yojana, November 1998, 39}

10 Damaged apples used for producing ethyl alcohol

Indian scientists have developed a new method to produce ethyl alcohol, a chemical required for various commercial applications, using damaged, low grade and inferior quality apples.

Each year a large amount of apples perish in orchards due to inadequate storage and transportation facilities as well as diseases. Those fruits can be used for manufacturing ethyl alcohol, D .R. Modi from Faizabad-based Ram Manohar Lohia Avadh University says in a report.

Mature apples are highly susceptible to damage even on slight pressure. Seasonal diseases also add to the fruit loss causing not only economic loss but also environmental pollution.

Modi and his colleagues used two yeast strains, sugar in the form of molasses and trace amount of urea to produce the alcohol from culled apples.

The yield is maximum when the sugar concentration varies from ten to 20 per cent, the report says.
(PTI Science Service, 17(15), 1998, 4)

PROCESSED PRODUCTS

11 Vegetable vaccine against diarrhoea

A U.S. researcher has developed a genetically engineered potato that could offer protection against food poisoning and diarrhoea.

Eating the "vegetable vaccine" produces an immune response which is as strong as when exposed directly to strains of *E.coli* bacteria which causes severe diarrhoea.

Charles Arntzen, a plant biologist from the Boyce Thompson Institute for Plant Research in New York, transferred the antibiotic gene of *E.coli* into the genetic material of potato. As the potato could not be tricked into producing enough *E.coli* proteins to elicit an immune response, he synthesized an artificial gene identical to the bacterium.

When small chunks of raw potato incorporated with the synthetic gene were taken orally by 14 volunteers, antibodies against *E.coli* appeared in the gut.

"This is going to be very effective strategy for delivering oral vaccines", Antzen says as the vaccine goes straight into gut. He hopes this engineered potato will be the forerunner of many edible vaccines against a wide range of diseases, including cholera and hepatitis B. He plans to test a potato vaccine for Norwalk virus that causes gastrointestinal diseases later this year.

(PTI Science Service, 17(20), 1998, 12-13)

12 Potato vaccine protects against diabetes

A genetically engineered potato could offer an edible vaccine against childhood diabetes, *Reuter* quoting U.S. researchers said. And, they said, they used the deadly cholera toxin to make their vaccine work even better.

William Langridge from the Loma Linda University in California and colleagues have been working on various potato-based vaccines. They have genetically engineered potatoes that produce proteins from other species—first from the cholera toxin and now from human beings.

By engineering a potato to produce human insulin, they have used it to make a vaccine against type-1 diabetes.

Type-1 diabetes is often inherited and strikes in childhood. It is an autoimmune disease, one in which the body immune system mistakenly turns on itself.

In this case, the immune cells destroy the islet cells in the pancreas that produce insulin. Victims must take insulin for the rest of their lives and often suffer serious nerve damage because of their disease.

“What we are doing is protecting against this sensitization against cells,” Langridge said, adding it helps the immune system tolerate the insulin-producing cells.

To get the potato-produced insulin into the gut where it could be used, they attached it to the cholera toxin – whose deadly effects are due in part to its ability to go straight to the gut and cause severe diarrhoea.

They used a piece of the cholera toxin that transports the microbe but does not affect the body.

The cholera “subunit” carried the insulin right to the lining of the gut in mice that Langridge’s team tested, making the process very efficient. “The plant can probably produce 800 to 1,000-fold less of the protein than we thought we would need,” Langridge said.

Mice bred to be diabetic who were fed the potatoes were much slower in developing diabetes and showed less of the inflammation of the pancreatic islet cells that precedes the disease.

What the vaccine effectively did, Langridge said, was help a faulty immune system recognise and tolerate insulin. This means immune cells would stop attacking the insulin-producing cells.

Langridge has produced a cholera vaccine that works in mice and also survives cooking. “We did not cook these potatoes,” he said. “But I would guess that we could probably cook them.” He said it was impossible to determine how much of the potato a person would have to eat. His work is a long way off from human trials. He said potatoes cannot produce enough insulin to make them a useful source of the insulin used to treat both types of diabetes.

Most people have type-2 diabetes, which can be treated with drugs, diet, exercise and, in severe cases, insulin. It is caused when the body ceases to respond to insulin,

which is still produced by the pancreas.

Langridge's team is also working on multiple vaccine against cholera, rotavirus --- a common cause of diarrhoea -- and the *E.coli* bacteria that cause food poisoning.

{PTI Science Service, 17(20), 1998, 17-18}

EQUIPMENT & MACHINERY

13 Equipment and process for detection of glass debris

A method for detection of glass debris in beer bottles is based on collection of any glass debris into a small volume in a defined location in the bottle. This is achieved by holding the bottle with its axis at an angle to the vertical, and rotation of the bottle on its axis; this gives a high likelihood that any glass debris present will collect in the lower portion of the bottle under the force of gravity. Collection of the debris into a small volume of defined location eases its detection and identification.

{Trends in Food Science & Technology, May 1998, 216}

14 Method and system for fecal detection

A method and apparatus for detecting the presence of faecal or ingested matter on poultry or meat products are described. The product is transported on a conveyor past a UV light transmitter receiver, where UV light is reflected off the product. The

reflected light is compared to a threshold value, above which indicates the presence of contaminants. If contamination is detected, the controller can generate a signal and or send the contaminated products to a wash station.

{Trends in Food Science & Technology, May 1998, 216}

15 Fruit peelers go worldwide

Peeling fruits such as apples, pears and peaches is a specialized technology. Italian company ABL provides a range of fully automatic fruit processing equipment worldwide.

"We supply primarily apple processing machines, but also machines for peeling, coring and cutting other fruits and tomatoes," said Daniela Ascari of ABL. "We can supply complete processing lines, if required, or individual machines."

During processing, apples are graded into small, medium and large sizes to prevent losses. Fruits are conveyed in water via hydrofeed tanks to an elevator which collects them one at a time and places them upright already for automatic peeling, coring and slicing. Round rings of apple can be produced for products such as confectionery or bakery items where the fruit must look attractive.

{Food Engineering International, June 1998, 26}

16 Biochromatic/ Infrared color sorter

For all rice, coffee, nut, lentil, bean and seed processors, the 90000B is the most effective quality assurance and defect removal system available. The sorter excels in removing subtle color defects, nut shells and foreign materials including glass. High resolution infrared and visible sensors ensure that even the smallest defects are removed. The new 90000B opens up a whole new world of opportunities for processors who know they need the best.

Contact: Sortex Ltd., Pudding Mill Lane, London E15 2PJ, UK.

(*Food Engineering International*, June 1998, 58)

17 Leak testers for pharma and food applications

Non-destructive electronic leak testers for the pharmaceutical, food, metal can, automotive and plastic industries are available from Wilco AG, Switzerland. The most commonly used testing methods are helium, differential pressure, optoelectronic, SF₆/NO₂ /CO₂ laser and the latest world patent pending Liquid Filled Container (LFC) method. The LFC method has revolutionised leak testing and can test any type of container, filled entirely or partly with liquid. Temperature and relative humidity changes will not affect the testing and liquids do not have to be conductive. The product line offered encompasses both manual loading statistical leak

testers as well as fully automatic on-line equipment. For pharmaceutical applications, the products tested include plastic and glass vials, ampoules, Blow-Fill-Seal containers, contact lenses, syringes, plasma bags and blister packs. Food packaging industry applications cover empty and filled flexible containers, thermoformed containers with heat sealed lids, food/snack paper or plastic foil pouches, metal cans, etc. Testers for plastic bottles including returnable 20-litre PET water bottles, with rates of 500 bottles/hour are also manufactured. Rotary 36-station aerosol can testing equipment which tests for leaks with a speed of 36,000 cans per hour and leak rates of less than 1 cc / min is another Wilco product. Validation documentation including Functional Specification (FS), Design Specification (DS), Operational Qualification (OQ), and Installation Qualification (IQ) is available with every inspection system.

For further information contact: Measure Test Corporation, 53A, Meherina Nepean Sea Road, Mumbai-400 026.

(*Industrial Products Finder*, August 1998, 172)

18 Drying ovens

Magumps offers oven used for drying of powders, bottles, roasting of seeds and masalas. It is made in double walled construction with glasswood insulation and fitted with U tube heaters of Escort make. The air

is circulated inside by means of a fan driven by a motor. The temperature is controlled by means of a thermostat and the unit is supplied complete with electrical panel box having indicating lamps, temperature indicator relay, motor, and contractor. The trolley can be supplied as per the customer's requirements. The unit can also be supplied with steam heating system.

For further information contact: Magumps, Trisandhya A, 97 D Phalke Road, Dadar, Mumbai - 400 014.

(Industrial Products Finder, December 1998, 85)

19 Acid test explores that ripe moment

Fruit farmers will soon be able to tell exactly their crops are ripe for picking, thanks to a small, cheap probe developed by researchers at the University of Southampton. The probe, which measures acidity and sugar levels, has just been tested on fields of tomatoes in California by a ketchup manufacturer.

The probe is made by printing six tiny electrodes on a substrate of aluminium oxide 600 micrometres thick, says John Atkinson, who heads the research team. It measures about 2.5 centimetres by 5 centimetres. Similar probes have been used to test water quality and to detect gas.

To test for ripeness, the researchers cut open a tomato and insert a capillary that sucks up juice

into the probe. Three of the electrodes measure the pH and the others the concentration of sugar in the juice. "The test takes seconds," says Atkinson. The great advantage of the probe, says Atkinson, "is its price, size and ruggedness". The university made 15000 probes for the Californian trials at a cost of just 50 p each. "It's virtually a throwaway sensor," says Atkinson.

If the Californian trials prove successful, the researchers intend to develop a portable data processor that can give farm workers an instant print-out as they walk around their fields. Currently, data from the probe are fed into an office computer for analysis.

"It certainly sounds like a useful bit of equipment," says Kate Evans of Horticultural Research International, which is based in Kent. She points out, however, that there are other ways of testing for ripeness in the field. HRI, for example, uses a hand-held pH meter.

(New Scientist, 7 November 1998, 11)

20 Machine takes the taste test

A new taste-sensing system that mimics the way humans taste food has been developed by Japanese researchers. The system, jointly developed by researchers of Anritsu Corporation and Kyusyu University, is primarily designed to detect the taste of drinks such as beer, tea and coffee, and is able to discriminate between

different brands of a particular product.

Sensors have already been invented to reproduce the human senses of sight, hearing and touch. These senses are relatively simple to reproduce because they involve the detection of a single physical quantity such as light, sound or pressure.

But it is more difficult to reproduce the more subjective senses of taste and smell. These are typically generated by many different chemical substances, and man-made sensors must respond to all of these chemicals at the same time.

The new taste sensor is based on the concept "global selectivity", which classifies an enormous range of chemical substances into a few broad groups. Such an approach is common in the taste-sensing systems found in nature.

Although there is no established theory to describe how a substance interacts with the taste cells of living organisms, one model has come to the fore. The tongue and mouth contain many taste cells with a range of characteristics. When a taste substance touches the human tongue, it is adsorbed by the "microvillus" of a taste cell - a finger-like part of the cells inner membrane. This adsorption changes the electric potential on the membrane of the taste cell, and different types of taste cells produce a different electrical response. It is thought that the brain processes the

electrical signal using pattern-recognition techniques, and hence is able to identify different tastes.

To imitate the function of natural taste cells, the new system contains several sensors based on artificial lipid membranes which are designed to have different electrical responses, mimicking the effect of taste cells with different characteristics.

Changes in the electric potential of the lipid membranes are recorded as the taste substances are absorbed, and the output electrical signal is analysed by pattern recognition software.

A combination of eight taste sensors are used to detect all of the substances that might exist in a sample, and the electrical signals from the lipid membranes are analysed using principal component analysis. This yields a taste "map" of the sample, which can be compared with present sample data. An automated sampling device can also be used to improve efficiency and make the measurement conditions more uniform, to improve accuracy.

A "relative value" measurement is more effective when measuring subtle taste differences in a single type of product, such as tea. In this type of measurement the sensor is first soaked in the reference solution to stabilise the surface conditions of the artificial membrane, and then the

output is measured for the sample drink.

The difference between the two is taken as the sample output. The relative-value measurement allows minute taste differences to be measured, and also offers high repeatability. In particular, the sensitivity of the system to saltiness and sourness is 10 times greater than the human sense of taste.

The taste-sensing system has been applied to various drinks-including beer, coffee, tea, Japanese sake and mineral water-and can easily discriminate between different brands of a particular product.

In the case of beer and oolong tea, the system can also detect the difference between different batches of the same brand. And it can detect changes in the taste of coffee and tea as the product deteriorates with time.

It is extremely sensitive to salty and sour taste, but is not very responsive to the saccharides that produce a sweet taste. This sweetness is essential in soft drinks, and an important goal of future work will be to ensure that the sensors are more sensitive to these chemicals. To improve the performance of the sensor, new measurement techniques are being developed and artificial membranes improved.

It can be used in the food industry for automatic quality control and to establish a taste standard for

particular products, allowing taste to be evaluated objectively. Applications in new areas, such as medicine and checking of water quality are also anticipated, the report says.

(PTI Science Service, 17(15), 1998, 12-13)

21 Dehydration plant for horticultural products

Tech-Know Consultants offers a commercial plant to dehydrate horticultural products – in this case marigold petals – at selective temperature between 27° C to 34° C, within 24 hours, depending upon moisture content. This temperature range gives advantage over conventional hot air drying by way of excellent colour, aroma and highest extraction of colour of the finished product. Power consumption is 0.5 kW for 1 kg of water removed and recovered. For 500 kg input per batch, the plant requires 3 phase 415/440 volt, 25 HP power connection. Any capacity plant along with desired level of automation can be provided for the unit to operate. As an additional advantage, the moisture removed is collected as quality distilled water (nearly), making the unit eco-friendly in the true sense. Pilot plant trial facility is offered at cost.

For further information contact: Tech-Know Consultants, Post Box 7263, Mumbai – 400 077.

(Industrial Products Finder, September 1998, 15)

22 Arecanut/ Mushroom dryer

CM Equipment offers an arecanut/mushroom dryer which uses a special design to dry arecanut, mushrooms, papads, cardamom, grapes, cashew nuts, spices, fish, garlic, coconut and also pharmaceutical powders, granules, etc. Temperature is adjusted automatically by a solid state electronic digital controller. The unit comes with 6, 12, 24, 48, 96 and 192 trays. Also manufactured are cold and hot cyclic chambers, climatic chambers, hot air ovens, salt spray (fog) testing chamber, incubators, deep freezers, de-humidifiers, water baths, etc.

For more details write to: CM Equipment & Instruments (India) Pvt. Ltd., B-194, PO Box 5847, 5th Main, Peenya II Stage, Bangalore – 560 058. (*Chemical Products Finder, September 1998, 99*)

PACKAGING

23 Proper packaging can prevent food wastage

An international conference organised by Confederation of Indian Industry during the Agro-Tech'98 on Agro Packaging can prove to be an eye opener for many if one goes through the FAO survey.

The FAO survey indicates that average "post harvest wastage in India ranges between 10-26 percent" in respect of various food products.

For fruits & vegetables, the figures vary between 18-33 and for roots and tubers between 12-26 percent.

Also a huge amount of foodgrain is lost every year due to improper packaging and storage. About 5 to 10 percent of grains are lost in rural storage structures and about 2 percent are lost in transit and storage under the procurement operations.

Chief regional manager, Indian Petrochemicals Corporation Limited, A Guha and general manager (Polymer Business Group) PR Singhvi, who presented papers on applications of plastics in post harvest agriculture during the Agro-Tech, were of the view that in a country like ours, where over 50 percent of population was below poverty line, half of the battle against hunger could be won, if we could prevent this enormous wastage by introducing proper packaging during storage, transport, distribution and retail sales.

The experts were of the opinion that major causes of wastage were inadequate storage facilities, improper packaging during storage and transfers and human factors including carelessness. Notions like that the processed and packaged food do not remain fresh food, processing reduced the food value, packaging was only for aesthetics and advertisement and other myths had also led to these wastage.

Experts said that it was possible to extend storage and shelf life of post harvested fruits by 200 percent-400 percent by use of appropriate plastics packaging. Flexible plastics films and laminates used for packaging of food products imparted suitable barrier properties to the package to protect the content from either loss or gain of gases, moisture and aroma while being compatible with the content.

The fresh fruits and vegetables contained upto 75-90 percent waste in them. Loss of moisture from these products results in product spoilage. Gain of moisture in certain food products like biscuits, bread, potato chips, etc., makes the product soggy and there may be fungus growth in bread and cakes.

Caking of milk powder and instant coffee were examples of product spoilage due to moisture gain. Vegetable oil, ghee and various fatty products like desiccated coconut powder, chips gain free fatty acids on exposure to atmosphere due to oxidation of unsaturated molecules and eventually become rancid. Tea, coffee and spices lose their aroma and quality unless these were packed in barrier packaging.

The experts said that use of plastics in packaging could offer quality products with longer shelf life, reducing wastage, thereby increasing the total availability. Processed foods means more convenience and higher value addition. Better realisation for

farmers through processed food, minimal price fluctuation of seasonal products round the year and better packaging would boost exports and bring in precious exchange. Another expert Naom Issacharov, Director, Adamit Resources International Limited observed that the Xtend-Freshness Preservation Bags (FPBs) present a new era of innovative patented packaging, implementing modified atmosphere technology for the increase of storage and shelf life of assorted fruits and vegetables.

{The Financial Express, 7 December 1998, 16}

24 Biodegradable container

What is claimed to be the first biodegradable container, suitable for yogurts, creams and similar foods, was launched at the recent Pakex exhibition by Autobar Packaging UK of Dragonville Industrial Estate, Durham, tel:0191-386 9555.

The new container has been specially developed to meet increasing concerns over packaging waste. Whilst the traditional aim in the UK has been to influence the market to separate plastics, Autobar Packaging's pan-European presence has helped them to appreciate this is a difficult proposition, whereas the more practical solution of composting is already underway in other countries.

The new compostable thermoplastics container is made from polylactic acid, which is obtained from plants like maize or beetroot. The

PLA container is thermoformed on conventional machinery that has been suitably adapted. It can be decorated in the same way as materials, like polypropylene, polystyrene and polyethylene terephthalate, by dry offset printing, labelling or sleeving, and it is easy to seal.

(Food Trade Review, June 1998, 402)

25 Fully automatic side-seam welder for food and beverage cans

Mechelonic Engineers has developed the Body Maker, a fully automatic side-seam welder for the manufacture of food and beverage cans. The machine has a production rate of 250 cans per minute using multiple frequency up to 300 Hz. The overlap of weld is 0.4 mm. The unit meets the requirement of processed food industries for packing and preserving processed foods. It is also suitable for the manufacture of cans for beverage-filling and distribution. The machine features high speed of production, fully automatic operation, aesthetic can finish etc.

For more details write to: Mechelonic Engineers Pvt Ltd, 230-235 Solaris-I, Saki Vihar road, Powal, Mumbai 400 072.

(Chemical Products Finder, September 1998,17)

26 Fish curry in flexible pouches

Fish curry is now available in packed form, thanks to the technology

for its packaging developed by the Central Institute of Fisheries Technology (CIFT) here.

Under the new technology, ready-to-serve fish curry was packed in a three-layer configuration of flexible pouches, the CIFT sources said, adding that the retortable pouches made out of polyester, aluminium foil and cast polypropylene ensured the contents a shelf-life of one year at room temperature.

Earlier attempts to popularise ready-to-serve fish curry in metal cans did not meet with much success, mainly because the metal cans produced an undesirable taste on storage. Secondly, the tin plate for making the cans was imported, making it uneconomical.

Aluminium containers were also found not suitable because of the poor mechanical strength and high incidence of leakage through seams, the sources said adding that the new technology developed by CIFT opened the doors for large scale export of this much sought-after non-vegetarian dish.

The CIFT Director, Dr.K.Ravindran, said since the heat processing of retortable pouches required an over pressure autoclave, the institute had set up a pilot model of such an autoclave with full provisions for monitoring all functions associated with thermal processing of flexible pouches. The equipment for the purpose was made available to the

CIFT by the Natural Resources Institute, the UK, under a collaborative research project.

Fish curry-mainly sardines, seer and mackerel herring the CIFT-developed pouches-have already been handed over to a private seafood exporters here for test marketing abroad.

(Business Line, 11 December 1998, 13)

27 Edible Oils Packaging Order comes into effect

The mandatory packing of edible oil is likely to take considerable time for implementation despite the Centre's ban on the sale of loose edible oil coming into effect from Tuesday, industry officials have said.

"The order (making it obligatory on the part of edible oil producers to market the commodity in packed form only) will take time to be implemented. Though it is a beneficial measure, a lot of spadework needs to be done," the Centre for Oil and Oil Industry Trade (COOIT) executive secretary, Mr.K.M.L.Chabra, told PTI.

Most of the States had sought time ranging from four months to two years to impose the order in view of problems in implementing the order, they said. Though the order could be easily implemented in the metropolitan areas, progressive steps were required to put it into effect. Mr.Chabra said. "The implementation will take time since

the States have to look at catering all types of people in the society, their purchasing power and affordability," he said.

The Vanaspati Manufacturers Association Executive Secretary, Mr.S.K.Chadha, said the order was difficult to be implemented immediately since 60-70 per cent of edible oil was being consumed in the rural sector. "Moreover, it is difficult to find sufficient packing material for this," he said. Official sources denied that edible oil in packs would cost more. Even while buying loose oil, the consumers had to pay for the cost of tin in which it was being packed for retail sale.

(Business Line, 16 December 1998, 13)

ANALYSIS

28 Orange juice analysis

As a natural heterogenous mixture, orange juice has always presented an analytical challenge to producers.

A refractometer is the accepted instrument for measuring the dissolved solids content (Brix) of orange juice but commercial and legislative pressures have always meant that producers need to accurately measure the Brix value of the product, and this has presented problems because variations in the natural whole fruit, the solid/liquid mixture of juice, and the particle size of suspended fruit fibres mean that

determining the Brix value can be uncertain.

By working in conjunction with University of Westminster, Index Instruments have now produced a seven page Applications Note of the subject. The work carried out during this long-term study showed how the sample readings change with residence time in the instrument and how different sampling techniques influence the final result. Results from the study also highlighted which sampling and measurement method gave the most accurate result.

Interested readers can obtain a copy of this Application Note from Index at Bury Road, Industrial Estate, Ramsey, Huntingdon.
(*Food Trade Review*, June 1998, 375)

29 Fast food analysis

NDC Infrared Engineering has upgraded its moisture, fat and protein measurement and data acquisition system with new Windows-based software. Infralab Windows features a powerful networking and data exchange capability, a built-in bar-code reader for identification of samples and high precision measurement and data management functionality. The system offers precise measurement of critical process parameters quickly.

Infralab offers an alternative to continuous online measurement for process control in applications where the cost of on-line sensors may be

prohibitive or where continuous measurement is not necessary, according to the company. It is used for measurement of samples from multiple production lines, such as chocolates or other confectionery, or where parameters tend to change slowly with time such as biscuit production. It is also suitable where access to product on the line is difficult, for example cheese manufacture, and checking process parameters in batch production.

According to Dr.Ian Benson of NDC Infrared Engineering: "Under the Windows-based file management system of the new Infralab, it is easy to set up files for each production line sample point, operation or time period. These can then be called up or toggled between. The new software also calculated the average and standard deviation values for each sample set and automatically updated them as new data is added to the file."

(*Food Engineering International*, October 1998, 19)

30 The evils of milk

Some folks are about to try to convince that milk is toxic. But the real question is, What's more dangerous to your health: milk or celebrities and activists embarked on the latest trendy crusade ?. The AntiDairy Coalition is a band of physicians, self-described "Hollywood personalities" and others who decry what they call "the health and nutritional risks of consuming dairy products"

The coalition, including its spokes – Jeremiah, writer George Plimpton, would have you believe that milk causes heart disease, cancer, infections, asthma, allergies and tuberculosis. Robert Cohen, founder of the ADC (and author of *Milk: The Deadly Poison*), writes: “The Fountain of Youth and cure to illness can be obtained by giving up milk.” The ADC is spotlighting a question hotly debated by everyone from nutritionists to parents. Many patients ask doctors whether they should give up milk, like that supermodel they saw interviewed on TV and to be sure, the ADC’s overwrought claims do have some scientific basis.

Take heart disease. Foods like butter, cheese, ice cream and whole milk are packed with saturated fat, which clogs arteries and can lead to heart attacks. That’s why most nutritionists advise switching to low-fat or skim milk and eating more yogurt and cottage cheese than Haagen-Dazs and Brie. Even skim milk, though, can trigger allergies in some people, including infants, who in any case will get more iron and other key nutrients from breast milk or formula.

So must you flee from milk entirely? Yes, says Cohen, who holds that skim milk is the devil’s brew. It’s full of *protein*. And here’s where the ADC starts twisting the facts to reach wild conclusions. Allergies are frequently triggered by proteins ; asthma is an allergic condition ; it’s been increasing dramatically ; doctors

don’t know the cause ; therefore, the protein in milk must be the culprit .A similar leap of illogic assumes that because women in the Netherlands, Denmark, Norway and Sweden consume lots of milk and also suffer higher rate of breast cancer, the former must cause the latter. Another clunker is Cohen’s claim that widespread lactose intolerance – the inability to digest dairy products – means milk is of little use as a source of calcium. Infact, many cases of lactose intolerance are mild and interfere only slightly with calcium uptake. Many people intolerant of milk can easily digest yoghurt. And lactase tablets can make dairy products digestible even in severe cases.

If milk isn’t the perfect food, it’s still got some big things going for it. It’s an inexpensive source of calcium, protein, potassium and other vitamins and minerals. And unlike other sources of calcium, such as, say, steamed kale, milk is a food kids will eat. The ADC feels that milk is the root of most human maladies, but the villain is meat or wheat or sugar or some other substance that our species has long and happily consumed. Better to get back to the mainstream nutritionists, who emphasize a balanced diet and advise moderation in all things.

(*Time*, 22 June 1998, 13)

31 **Housewives kit to detect adulterated mustard oil**

Housewives can find out for themselves whether adulterated

mustard oil is being sold to them; thanks to two simple kits developed by the Industrial Toxicology Research Centre (ITRC) in Lucknow.

One kit, which detects the adulterant "butter yellow", has just entered the market. Butter yellow is added by unscrupulous dealers to colourless oil of any origin to impart the typical colour of mustard oil. The characteristic pungency of mustard oil is obtained by adding an essence of allyl isothiocyanate.

The second kit detects the presence of oil from seeds of the weed *Argemone mexicana*, responsible for outbreaks of epidemic dropsy including the recent one in Delhi. Some entrepreneurs have shown interest in marketing the kit for which a patent application has been filed.

Both kits can serve as handy tools at the retail outlet for random preliminary checking of adulteration, ITRC director Dr.P.K.Seth said. The kit to detect presence of *Argemone*, the most common adulterant of mustard oil, is a simple device that contains a specific cocktail reagent prepared by ITRC. On adding 0.5-1.0 ml of the reagent, the *Argemone* toxin separates as a lower layer. This extract when viewed under a simple fluorescence detection device developed by ITRC gives a fluorescent orange colour. The lower limit of detection of *Argemone* oil contamination by this test is 0.001 per cent, ITRC scientist Dr.Mukul Das, whose team developed the kits, said.

ITRC has also devised a simple confirmatory test that requires another reagent which, when added to the argemone layer, changes the orange colour to blue. The test is simple and can be performed by any layman, Dr Das said. The technology will be transferred to a Lucknow-based entrepreneur in about six months, he added.

Another kit developed at ITRC, a laboratory under the Council of Scientific and Industrial Research (CSIR), consists of five filter paper strips pre-coated with a chemical, and an outer cover sheet showing colour of different intensities of butter yellow.

Butter yellow, a highly toxic adulterant that damages the liver and makes a person prone to liver cancer, is banned throughout the world. A drop of the test oil is placed on the colour detection (cd) strip. If the colour changes to pink, the oil is considered to be contaminated with butter yellow. Approximate concentration of butter yellow can be obtained by matching the colour of the test strip with the standard colour printed on the cover sheet. The minimum detectable concentration for this test is 0.001 per cent, a single test costs only 50 paise.

[PTI Science Service, 17(21), 1998, 2-3]

32 Automated method and test kit for free fatty acids in cooking fats and oils

Apparatus (a calibrated cylinder) and a method for

determining the percentage of free fatty acids in cooking fats and oils are described. The cylinder, which has a set of lines marked on it for reading the percentage of free fatty acids in the sample, is also used to measure the volume of the test sample and volume of the acid-base indicator solution.

(Trends in Food Science & Technology, May 1998, 216)

33 Beverage analyser

The Foss NIR Systems Rapitec™ Analyzer accurately measures the percentages of alcohol, brix and other beverage quality factors in under one minute. Samples need no additional preparation, the beverage can simply remain in standard cups. Sampling errors that normally occur during the preparation process are eliminated. The Rapitec can perform multiple analyses simultaneously on a single sample and replaces several older chemical tests. Almost any beverage can be analysed using the Rapitec Analyzer, including carbonated or non-carbonated beverages, fruit juices, tea, coffee or even water.

(Food Engineering International, June 1998, 57)

34 Scientists find fast way to detect salmonella

In a discovery that could save lives, scientists at the U.S. Agriculture Department have developed a technique to rapidly detect a deadly strain of *Salmonella* bacteria, reports

Reuter. "Quickly identifying outbreaks of this bacteria is vital to protect public health," *Reuter* quoted U.S. agriculture secretary Dan Glickman's statement. This important research cuts identification time from six weeks to two hours".

The strain of *Salmonella*, DT 104, is especially dangerous because it is resistant to many antibiotics. Researchers were able to find the strain's gene sequence, allowing scientists to quickly identify the bacteria. Glickman said, the U.S government hopes to develop test kits that could detect the strain in blood samples or in run off water.

Salmonella has been linked to as many as 3.8 million illnesses annually in the United States and was the second-most common bacteria found in food poisoning cases in 1997, according to a Centres for Diseases Control (CDC), report. *Salmonella* is usually transmitted in raw or under-cooked eggs, poultry and meat and in raw milk and dairy products. Symptoms include stomach pain, diarrhoea, nausea, chills, fever and headaches.

The bacteria is estimated to cause losses worth billions of dollars in productivity and due to increased medical expenses in the United States every year.

(PTI Science Service, 18(3), February 1-15, 1999, 13)

COMMERCIAL INTELLIGENCE

PRODUCTION (RAW MATERIALS)

35 **Indians eat too much rice, says FAO**

The average Indian Citizen has about ten per cent less food to consume than the global per capita food supply, but has more to eat than an average citizen in the developing world, according to the UN Food and Agriculture Organisation (FAO).

In its latest map on nutrition, the Rome-based body says Indians in general depend too much on cereals like rice while eating less of vegetable or protein-rich foods. This, says the FAO, does not help develop healthy lifestyles.

The FAO says that whereas the global average food availability per person per day is 2,720 kilo calorie (Kcal), in India it is 2,390 Kcal. The average per capita food availability in developing countries is 2,060 kcal. These figures are taken out of the "food balance sheet," prepared by the FAO for most countries of the world.

This sheet includes data on local food production, plus food import minus food export. In other words the food balance sheet reflects the amount of food available at a given time, explains Jean Pierre Cotier, chief of the nutritional planning,

evaluation and assessment division of the FAO.

The world body says a varied and balanced diet provides a variety of nutrients, carbohydrates, fats, proteins, vitamins and minerals which are essential for growth and development and for prevention of diseases.

The nutritional data provided by the FAO shows that be it the industrialised North or the poorer south, the food intake is generally not supportive of what could be described as healthy eating habits. However, it says citizens of the industrialised countries have a diet more balanced than their counterparts in the poorer parts of the world.

According to the data, the average daily dietary intake in the richer countries is 3,340 kcal, with Denmark topping the list with 3,780 kcal. Cereals, the backbone of the diet of developing countries, account for just over a quarter of the diet in the industrialised countries with another quarter being provided by meat, fish, eggs, milk and cheese. Fat constitutes a significant portion of the diet in West, which leads to widespread obesity as well as non-communicable illnesses like cardio-vascular diseases and high blood pressure.

In the South Asian region, the story is different. About 60 per cent of the food intake is made up of cereals and is followed by vegetables, sugar products, pulses and nuts – all in

significantly smaller amounts, according to the FAO.

Almost two-thirds of the diet of an average Indian comes from cereals and it is followed by sugar and fat products and then pulses and nuts. About five per cent of the diet stems from dairy products while roots and tubers or vegetables account for marginal amounts, less than five per cent, respectively, the FAO says.

Within the region, there are different eating habits. Of all the South Asians, it is perhaps the Maldivians whose eating habits resemble something closer to a healthy standard when compared to regional habits.

"Only" over 40 per cent of their food is made up of cereals while about 15 per cent is meat, fish and dairy products. However, they are also the South Asian leaders in consuming sugar products, with a consumption rate of about 15 per cent per person per year.

With about half the diet composed of cereals, those living in Pakistan and Sri Lanka also eat less rice than their counterparts in India or Bangladesh where cereal content is almost 85 per cent. But while Pakistanis eat almost the same amount of sugar and vegetable oils and fats, Sri Lankans eat more pulses and nuts while taking less sugar products and even lesser vegetables. *{The Economic Times, 18 December 1998, 18/}*

36 Asia Pacific, bakery and cereals market consumption per head by country (Kg/head 1993-97)

Kg/Head	1993	1995	1997	CAGR % 1993-7
Australia	76.56	78.34	77.58	0.3
China	0.42	0.42	0.45	1.7
Hong Kong	13.21	15.16	16.58	5.8
India	0.63	0.73	0.88	8.8
Indonesia	1.70	1.72	1.76	0.8
Japan	28.82	28.63	29.41	0.5
Malaysia	8.75	9.57	9.79	2.8
New Zealand	63.84	62.63	61.50	-0.9
Pakistan	2.78	2.96	2.96	1.6
Philippines	0.77	0.84	0.89	3.9
Singapore	15.48	17.44	17.77	3.5
South Korea	3.35	3.68	3.95	4.2
Taiwan	6.38	7.88	8.98	8.9
Thailand	5.50	5.66	5.84	1.5
Vietnam	0.26	0.27	0.27	0.7
Average	2.78	2.83	2.91	1.1

{Food Ingredients & Analysis International, September 1998, 9/}

37 Production of fruits and vegetables in India

(in million tonnes)

Year	Fruits	Vegetables
1991-92	28.63	58.53
1992-93	32.96	71.00
1993-94	39.47	65.09
1994-95	38.60	67.29
1995-96	41.51	71.59
1996-97	46.97	80.80

{Yojana, November 1998, 38/}

38 Chilli production

Major centres of chilli production in India

(in '000 tonnes)

	'94-95	'95-96	'96-97
AP	348.0	363.5	464.5
Karnataka	101.5	108.1	121.9
Orissa	76.9	78.6	71.4
Maharastra	56.9	58.5	59.6
Rajasthan	39.4	37.2	58.8
Tamil Nadu	47.6	27.7	26.5
Others	125.4	236.1	142.8
All India	794.7	809.7	945.5

{The Financial Express, 7 November 1998, 10}

39 Onion production

	Area (hectares)		Production (lakh tonnes)	
	KHARIF	RABI	KHARIF	RABI
Andhra Pradesh	8,000	4,000	1.1	1.0
Bihar	6,000	12,000	1.0	0.7
Gujarat	-	9,000	-	2.0
Haryana	5,000	-	0.6	-
Karnataka	10,000	28,000	1.2	2.0
Madhya Pradesh	5,000	13,000	0.6	1.7
Maharastra	11,000	32,000	1.5	6.0
Orissa	-	42,000	-	2.9
Rajasthan	8,000	10,000	1.2	1.0
Tamil Nadu	9,500	10,000	1.2	0.5
Uttar Pradesh	-	40,000	-	5.0

{Indian Express, 5 November 1998, 9}

40 State-wise production of onion

	1993-94	1994-95	1995-96	1996-97	1997-98
Maharashtra	12.10	12.07	11.21	12.45	10.37
Gujarat	5.49	5.62	4.44	5.58	5.13
Uttar Pradesh	3.32	3.19	4.05	5.13	4.49
Karnataka	4.14	4.32	4.15	3.20	2.80
Orissa	3.21	3.62	3.37	3.28	3.09
Tamil Nadu	1.98	2.94	2.55	3.20	2.96
Andhra Pradesh	4.15	3.15	3.73	2.20	1.84
Madhya Pradesh	2.27	2.15	2.07	2.36	2.07
Rajasthan	1.22	0.92	1.62	2.20	2.00
Bihar	1.49	1.43	1.36	1.05	0.82
Haryana	0.42	0.68	0.88	0.75	0.45
Others	0.27	0.30	0.42	1.32	0.84
All-India	40.06	40.36	39.85	42.72	36.86

{Business Line, 12 October 1998, 8}

41 Break up of the production of processed fruits and vegetables (in per cent)

Processed form of the product (1)	1985-86 (2)	1995-96 (3)
RTS beverages	15.17	27.00
Canned and bottled fruits and vegetables	7.8	3.69
Fruit juice	12.00	3.28
Fruit pulps	13.90	22.51
Jam/ Squash/ Syrup	21.61	7.45
Fruit juice concentrate	2.1	0.95

(1)	(2)	(3)
Pickles, preserves and chutneys	13.68	11.00
Dehydrated fruits and vegetables	1.3	2.22
Frozen fruits and vegetables	0.56	9.36
Tomato, tomato products	5.90	8.05
Others	5.98	4.49

{Yojana, November 1998, 38}

42 Estimates of potato production

Area: lakh hectare
Output: lakh tonne

States	1997-98		1998-99	
	Area	Output	Area	Output
UP	4.00	60.00	4.10	94.00
Bihar	2.90	29.35	3.00	40.00
West Bengal	2.60	65.00	2.45	60.00
MP	0.47	5.47	0.55	8.10
Gujarat	0.28	7.10	0.32	7.88
Punjab	0.50	10.00	0.50	7.25
Haryana	0.14	1.50	0.16	2.50
Others	1.15	14.53	1.27	15.89
Total	12.04	192.95	12.35	235.62

(The Financial Express, 23 November 1998, 13)

43 Banana hybrids under trial

The country is the largest producer of bananas in the world with an annual production of 13.095 million tonnes from an area of 4.33 lakh hectares spread over Tamil Nadu (0.83 lakh ha.), Maharashtra (0.61 lakh ha.), Karnataka (0.51 lakh ha.), Andhra Pradesh, (0.41 lakh ha.), Assam (0.4 lakh ha.), Gujarat (0.28 lakh ha.), Bihar (0.26 lakh ha.), Kerala (0.25 lakh ha.), Orissa (0.22 lakh ha.), and Madhya Pradesh (0.18 lakh ha.).

Out of a total area of 3.36 million ha. under fruits in India, banana occupies 12.9 per cent of area and 31.7 per cent of the total fruit production. Tiruchi in Tamil Nadu; Jalgaon, Ahmednagar, Dhule, Nanded and Parbhani in Maharashtra; Kurnool, Cuddapah, East Godavari and West Godavari in Andhra

Pradesh are the major banana producing districts.

To meet the requirements of quality planting materials, tissue culture technology is available in the country.

The State agricultural universities such as the Tamil Nadu Agricultural University and the Kerala Agricultural University; private companies such as Indo-

American Hybrid Seeds, Bangalore, are marketing T.C plants of banana. The National Research Centre on Banana (NRCB), Tiruchi, and the All-India Coordinated Research Project with eight centres spread over eight states are providing

research support for a competitive and viable banana industry in India.

Hybrids in banana (FHIA-01, FHIA-03) with earliness and higher productivity are now under trial. The NRCB has identified accessions such as Silk, Monthan, Pisang Awak and Saba to be very promising. 'Grand Naine' and introduction is becoming popular in India.

Banana can be grown throughout the year and the harvesting season extends through the year in the major States. This is the greatest strength of India as a producer and possible exporter of bananas.

The national productivity of banana is 30.24 tonnes/ha., with Maharashtra recording the highest (48.02 tonnes/ha.).

The annual global production of bananas is 55.79 m.t with India (13.095 m.t), Brazil (5.6 m.t.), Ecuador (5.3 m.t.), the Phillipines (3.2 m.t.), Indonesia (2.6 m.t.), Mexico (2.1 m.t.), and Colombia (2.1 m.t.), being the major producers.

All parts of the banana plant are useful. Paper board, tissue paper etc., are made out pseudostem. Value-added products from fruits are chips, fig halwa, soft drink, flour and powder, banana chocolate and papads and jams.

There are exclusive varieties for leaf production which has usage in

the packaging industry and to serve the South Indian food. In Uganda and Tanzania, beer is made from banana.

The main cultivators in India are poovan, kanchkela, dwarf cavendish, harichal, martaman, hill banana, nedran, safed velchi, lal kela, kunnan, gros michel and giant governor.

The main constraints of banana production are the incidence of diseases such as fungal wilt, sigatoka disease, bacterial wilt (moko disease), viral bunchy top and banana mosaic. Post-harvest losses (20-80 per cent) are reported in bananas.

India, being the largest consumer of bananas, can sustain a high productivity-oriented production chain. Major markets abroad for Indian bananas are in – Nepal, the Netherlands, Qatar, Russia, Saudi Arabia and Bahrain.

(Business Line, 2 November 1998,8)

44 India set to overtake US as top milk producer

India will, for the first time, become the world's biggest milk producing country in 1998-99, with the production forecast to reach 74 million tonnes, according to the UK based *Dairy Industry Newsletter*.

In its latest issue (Vol.10, No.10), the international dairy journal has said the country would overtake the US as the world's leading milk

producer during the current year. The latter's milk production has been virtually static in the recent years, at around 71 m.t. whereas India's has been increasing at the rate of nearly four per cent in the current decade.

The newsletter has attributed the tripling of the country's milk production over the last 25 years to "the initiatives of the National dairy Development Board and the massive Operation flood project, the world's largest dairy development programme funded by the European Union, the World bank, Food and Agricultural Organisation and the World Food Programme". As a result, the milk production which was virtually stagnant prior to the launch of Operation Flood programme in the early 1970s – 17 m.t. in 1950-51, 20 m.t. in 1960-61 and 22 m.t. in 1970-71 – has since then gone up significantly to touch 31.6 m.t. in 1970-71 and 53.9 m.t. in 1990-91.

During the current decade, the output rose further to 55.7 m.t. in

1991-92, 58 m.t. in 1992-93, 60.6 m.t. in 1993-94, 64.1 m.t. in 1994-95m 66.1 m.t. in 1995-96, 68.5 m.t. in 1996-97 and an estimated 71 m.t. in 1997-98. Moreover, just over half of the country's milk production is from buffaloes, the newsletter has said.

Leading milk producers:

(in million tonnes)

	1997-98*	1998-99**
India	71	74
US	71	71
Russia	34	33
Germany	27	27
France	24	24
Pakistan	21	22
Brazil	21	22
UK	14	14
Ukraine	15	14
Poland	12	12
New Zealand	11	12
Netherlands	11	11
Italy	10	10
Australia	9	10

Estimated* ; Forecast**

{Business Line, 14 October 1998,21}

45 Tea production

(million Kgs)

Category	North India		South India		All India	
	1998	1997	1998	1997	1998	1997
CTC	340.02	309.23	109.52	107.59	449.54	416.82
Orthodox	44.02	39.89	22.72	20.43	66.74	60.31
Others	2.99	3.03	1.20	1.13	4.20	4.17
Total	387.03	352.15	133.44	129.15	520.48	481.30

{The Economic Times, 12 October 1998, 12}

46 Major cashew producing states

Area in hectares; Production in tonnes

States	1996-97		1997-98	
	Area	Production	Area	Production
Kerala	119000	134000	120000	100000
Maharashtra	80000	80000	103500	60000
Andhra	121000	60000	124100	50000
Orissa	105000	40000	108600	45000
Karnataka	85000	52000	87000	35000
Tamil Nadu	79000	30000	80500	30000
Goa	51000	20000	52000	25000

{The Financial Express, 28 December 1998, 16}

PRODUCTION (INDUSTRIAL)

47 World sugar production

	1997-98	1998-99	1999-2000
E.U	19.4	18.9	18.5
India	13.9	15.3	16.5
Brazil	15.7	16.1	15.8
China	8.5	8.7	8.7
F.S.U	5.8	5.9	6.3
Australia	7.2	7.2	7.3
U.S	4.3	5.0	6.0
Thailand	4.1	4.5	4.8
Cuba	3.2	3.8	4.3
Others	42.9	43.0	43.2
TOTAL	125.0	128.4	131.4
% Change	1.1	2.7	2.3

{Business Line, 16 October 1998, 22}

48 State-wise sugar production

(in lakh tonnes)

	1997-98 *			1998 – 99 **		
	Co-op.	Pvt.	Total	Co-op.	Pvt.	Total
Andhra Pradesh	2.11	5.71	7.82	2.60	7.40	10.00
Assam	0.03	0.01	0.04	0.04	0.00	0.04
Bihar	0.00	2.99	2.99	0.00	3.00	3.00
Gujarat	8.89	0.00	8.89	10.80	0.00	10.80
Goa	0.10	0.00	0.10	0.20	0.00	0.20
Haryana	2.05	1.77	3.82	1.90	1.60	3.50
Karnataka	4.57	5.00	9.57	6.50	5.50	12.00
Kerala	0.06	0.00	0.06	0.13	0.00	0.13
Madhya Pradesh	0.31	0.37	0.68	0.49	0.41	0.90
Maharashtra	37.46	1.01	38.47	52.00	1.00	53.00
Orissa	0.07	0.50	0.57	0.13	0.67	0.80
Pondy	0.19	0.18	0.37	0.18	0.17	0.35
Punjab	2.06	1.25	3.31	1.90	1.10	3.00
Rajasthan	0.07	0.22	0.29	0.10	0.14	0.24
Tamilnadu	4.26	8.03	12.29	5.00	9.00	14.00
Uttar Pradesh	8.38	30.84	39.22	8.10	33.90	42.00
West Bengal	0.00	0.03	0.03	0.00	0.10	0.10
All-India	70.61	57.91	128.52	90.07	63.99	154.06

*{Business Line, 14 November 1998, 13}***49 Coffee production and export**

(lakh tonnes)

	Production			Exports	
	Arabica	Robusta	Total	Volume	Value (Rs. Cr.)
1990-91	0.78	0.91	1.70	0.86	253
1991-92	0.88	0.92	1.80	0.91	332
1992-93	0.73	0.97	1.70	1.14	376
1993-94	0.89	1.20	2.08	1.18	546
1994-95	0.79	1.01	1.80	1.28	1503
1995-96	1.03	1.20	2.23	1.55	1427
1996-97	0.90	1.15	2.05	1.63	1479
1997-98	0.98	1.30	2.28	1.47	1622
1998-99	1.00	1.30	2.30	1.70 *	

*Coffee Board estimates

{Business Line, 28 December 1998, 8}

**50 Production of solvent
extracted oils**

Oil Year (Nov.-Oct.)	Edible Oil	Industrial Oil	Total Oil produced
1985-86	2,62,279	1,76,353	4,37,632
1986-87	3,14,499	2,03,961	5,18,910
1987-88	3,47,956	1,94,288	5,42,239
1988-89	5,05,798	2,24,186	7,29,984
1989-90	5,76,477	2,21,499	7,97,976
1990-91	6,86,768	2,04,772	8,91,940
1991-92	8,49,765	2,35,692	10,85,457
1992-93	9,16,132	2,42,887	11,59,019
1993-94	8,57,741	3,52,172	12,70,913
1994-95	10,93,172	2,29,478	13,22,650
1995-96	12,85,605	2,33,724	15,19,329
1996-97	14,74,688	2,28,058	17,02,746
1997-May 1998	10,07,525	1,29,952	11,37,477

{ VOP News Bulletin, July 1998, 17}

**51 Production of vanaspati,
bakery shortening,
margarine, industrial hard
oil (IHO) and refined oil**

(Qty in MT)

	Vanaspati	Bakery shortening	Margarine	IHO	Refined Oil
November, 97	76243	4224	831	958	10946
December, 97	78785	4629	1027	1051	14952
January, 98	72430	5692	417	967	9621
February, 98	68241	6475	288	1217	12055
March, 98	72325	6492	276	957	9197
April, 98	80772	7630	433	1494	8479
Total	448797	35144	3274	6646	65252

{VOP News Bulletin, July 1998, 15}

52 Production of oilseed net domestic availability of edible oils during the year 1995-96, 1996-97 and 1997-98

(in lakh MT)						
Name of Oil Seed	1995-96 Oils	Oilseeds	1996-97 Oils	Oilseeds	1997-98 Oils	Oilseeds
A. Primary Sources						
Groundnut	75.8	17.43	90.2	20.75	74.6	17.16
Rapeseed/Mustard	60.0	18.59	69.4	21.51	62.1	19.25
Soyabean	50.9	8.14	52.0	8.32	65.2	10.43
Sunflower	12.6	3.78	13.2	3.96	11.9	3.57
Sesame	5.3	1.64	6.7	2.08	6.1	1.89
Nigerseed	1.9	0.57	1.6	0.48	1.4	0.42
Safflower	3.8	1.14	4.3	1.29	3.6	1.08
Castor	7.8	3.12	8.9	3.56	9.1	3.64
Linseed	2.9	0.87	3.3	0.99	2.9	0.87
Total	221.0	55.12	249.6	62.94	236.9	58.31
B. Secondary Sources						
Coconut		4.2		4.50		4.30
Cottonseed		4.0		4.80		4.00
Ricebran		4.5		4.60		4.80
Sol. Extd. Oils		4.9		4.30		4.20
Tree & Forest Origin		1.4		1.50		1.50
Total		19.0		19.70		19.00
Total 'A' & 'B'	221.00	74.12	249.6	82.64	236.9	77.31
C. Less Export & Ind. Use		10.00		10.00		10.00
D. Net domestic availability of Edible Oils		64.12		72.64		67.31
E. Demand		75.72		85.45		82.00
F. Shortfall		11.60 *		12.81*		14.60*

* Actual Import, Oil yearwise.

+ Actual Import during Nov.'97 – May'98 3.86 lakh MT as against 6.43 lakh MT during Nov.'96 – May'97

{VOP News Bulletin, July 1998, 14}

53 Highly underutilised oil mills

	No.of units	Annual capacity Mn/T	Capacity Utilisation %
Oil Mills (Crushing Units)	15000	36.0	40
Solvent Extraction Plants	600	31.0	33
Vegetable Oil Refineries	400	5.0	40
Vanaspati (Hydrogenated Units)	175	2.5	40

{The Economic Times, 2 November 1998, 12}

EXPORT

54 Major oilmeals export

1998	Soybean	Rapeseed	Groundnut	Rice Bran	Sunflower	Total
April	77,865 (158,558)	108,188 (77,555)	20,979 (26,016)	- (2,396)	- (800)	209,013 (282,222)
May	57,581 (103,360)	97,786 (146,930)	4,374 (11,954)	3,960 (23,405)	2,690 -	166,364 (285,649)
June	28,726 (31,631)	15,523 (61,894)	1,691 (23,024)	2,752 (6,114)	2,186 (825)	53,493 (127,091)
July	53,702 (57,462)	49,525 (109,341)	12,103 (34,402)	- (22,446)	650 (8,642)	115,980 (232,293)
August	127,775 (139,051)	60,170 (8,424)	17,887 (733)	- (2,437)	- (32,174)	205,832 (89,420)
September	128,393 (53,178)	49,778 (98,257)	14,087 (9,956)	- (6,550)	4,190 (-)	196,448 (178,492)
Total	474,042 (436,363)	380,970 (583,397)	71,094 (113,776)	6,712 (61,644)	9,716 (12,704)	947,130 (1,244,798)

{The Economic Times, 2 November 1998, 12}

55 Agri commodities export

(in Crore Rs.)

	1994-95	1995-96	1996-97	1997-98
Fresh fruits & vegetables	433.27	531.15	582.62	588.42
1. Fresh onions	204.61	230.72	265.21	205.37
2. Other fresh vegetable	44.13	70.47	75.94	114.07
3. Dried nuts	60.64	82.40	78.93	57.21
4. Fresh mangoes	45.03	38.52	44.88	73.25
5. Fresh grapes	40.85	54.76	52.65	66.40
6. Other fresh fruits	38.01	54.28	64.71	72.12
Processed fruits & vegetables	348.21	491.59	473.77	762.80
1. Dried/ Preserved Vegetables	146.52	247.66	231.08	472.96
2. Mango pulp	80.71	84.61	105.00	123.31
3. Pickles/ chutneys	49.75	52.55	56.43	79.07
4. Other processed F & V	71.23	106.77	81.26	87.46
Livestock products	448.38	682.58	803.60	902.17
1. Buffalo meat	324.37	555.00	619.04	729.46
2. Sheep meat	66.03	56.43	71.04	61.57
3. Poultry products	8.88	26.21	81.43	85.77
4. Dairy products	40.11	32.57	15.37	11.94
5. Animal casings	7.71	8.30	12.27	11.56
6. Processed meat	1.28	4.07	4.45	1.87
Other processed foods	414.92	1171.97	1835.91	1470.39
1. Groundnuts	101.32	230.69	331.59	560.90
2. Guar gum	142.82	227.10	356.13	545.23
3. Jaggery & Conf.	16.51	153.96	261.12	114.16
4. Cocoa products	7.15	8.85	9.80	8.74
5. Cereal preparation	68.89	103.87	108.86	112.25
6. Alcoholic beverages	46.21	43.84	187.82	70.44
7. Milled products	4.15	331.96	512.31	21.99
8. Misc preparations	27.87	71.61	68.28	36.68
Floriculture	30.84	60.14	63.40	78.59
Vegetable seeds	24.77	43.08	44.34	56.09
Non-basmati rice	340.40	3717.41	1924.72	1552.08
Basmati rice	865.39	850.66	1247.63	1683.80
Wheat	42.34	366.76	698.45	42.45
Other cereals	28.03	16.96	48.65	13.10
Total	2976.56	7932.33	7722.80	7107.88

(Business Line, 25 November 1998, 13)

56 India lags behind in fruit exports despite high output

India is the largest producer of fruits and yet accounts for only two percent of the global fruit exports – the paradox reflects the bottlenecks that the Indian fruit industry is facing today, according to experts.

Though many Indian fruits have competitive advantages in world trade, high post-harvest losses, high lending rates, poor infrastructure and high freight fares are stifling the growth of an organised horticulture industry and fruit exports in India, an Indian expert points out.

Manmohan Attavar, head of the Bangalore-based Indo-American Hybrid Seed Company said, in his inaugural address at a national symposium on the production of fruits that the country has the potential to be a major player in global trade and “it is time to use the emerging opportunities for rapid growth.”

The two-day symposium is being organised by the horticulture division of the Indian Agriculture Research Institute (IARI).

There is a gap between the potential and actual yields, he said. Indian horticulture experts have to contend with high interest rates of 16-17 percent, while their counterparts abroad, including in Asian countries such as Thailand and Sri Lanka, have interest rates as low as 4-6 percent.

High freight and transportation charges, poor infrastructure, low quality storage, refrigeration and grading facilities are other major barriers. “Unless we have a good domestic base, we cannot export,” Mr.Attavar warned.

Former director of IARI H.K Jain cautioned that the future of Indian fruit production would be judged by export and not mere production figures. India has vast potential for increasing its exports through meaningful introduction of a variety of fruits, Mr.Jain said.

For example, the entire Himalayan belt could be transformed into a major temperate fruit production zone by introducing a range of fruits that grow in temperate climate. Similarly the country could introduce a range of citrus fruits from Mediaterranean countries, both for juices as well as processed products such as jams and jellies.

“India should undertake a massive programme of introduction quickly. Otherwise intellectual property rights (IPR) regulations will make it increasingly difficult to introduce this diversity,” Mr.Jain said. India is “badly lagging” in post-harvest technologies and should pay attention to this aspect, he said.

Post-harvest losses in fruits continue to be high and need to be contained through scientific management, Mr.Attavar said.

Pre-harvest treatment, post-harvest packing and storage and value addition are major issues that would require special attention. – PTI.

(*The Economic Times*, 9 December 1998, 17)

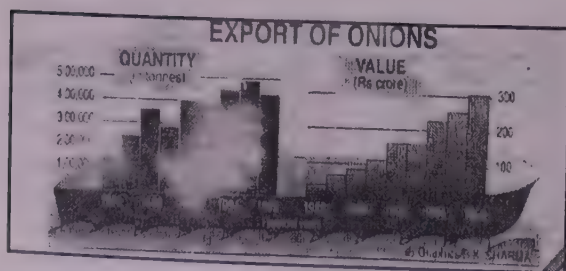
57 Exports of onion by NAFED*

	Quantity (tonnes)	Value (Rs. Crore)	Exports as % of production
1993-94	449431	250.12	11.21
1994-95	497000	257.00	12.31
1995-96	434638	312.78	10.91
1996-97	512553	336.56	11.98
1997-98	441265	293.76	11.96

* Includes exports by NAFED's associate shippers

(*Business Line*, 12 October 1998, 8)

58 Export of onions



(*Indian Express*, 5 November 1998, 9)

59 Export of fresh and processed fruits and vegetables (Rs.in crores)

Year	Fresh from	Processed from
1989-90	155	80
1990-91	170	95
1991-92	280	145
1992-93	347	206
1993-94	414	269
1994-95	437	249
1995-96	528	347
1996-97	579	326
1997-98		689*

* target value

(*Yojana*, November 1998, 38)

60 Govt lifts QRs on powder milk, ghee export

The government has decided to lift quantitative restrictions on export of powder milk and ghee to promote exports from the processed foods sector. Also an additional 23 herbal formulations have been freed for exports.

To promote development of herbal formulations the government has decided to impose a cess on the sale of these formulations.

Collections from the new levy will be used to form a fund to promote development of herbal plantations. A suitable scheme is being worked out by the ministry to promote the cultivation of herbal plants.

Export of milk items have been subject to quantitative ceilings from

the Agro Processing Export Development Authority (APEDA). Exporters of these items will no longer be required to obtain registration-cum-allocation certificates from APEDA, according to the notification issued by the Directorate General of Foreign Trade (DGFT).

The government has decided to free the export of 23 new plant formulations, however the export of plant portions from which the extracts are obtained will continue to be embargoed. Earlier, the government had banned the export of 53 plants and plant parts and their extracts.

(*The Financial Express*, 17 October 1998, 8)

61 Low supplies push down spices exports

	April – December 98		April – December 97	
	Quantity (MT)	Value (Rs lakh)	Quantity (MT)	Value (Rs lakh)
Pepper	22,250	42,007.50	26,554	32,474.95
Cardamom (S)	170	969.50	178	644.10
Cardamom (B)	850	638.00	893	647.83
Chilli	21,250	8,695.00	34,547	11,269.71
Ginger	8,600	3,175.00	14,948	4,586.61
Turmeric	18,000	7,170.00	21,300	5,897.24
Coriander	16,500	3,480.50	16,643	4,726.57
Cumin	9,650	5,760.20	10,762	5,497.67
Celery	2,550	605.10	2,598	604.41
Fennel	4,600	1,325.50	10,637	3,115.83
Fenugreek	5,900	1,087.70	4,218	604.41
Other seeds (a)	1,600	455.00	2,925	3,115.83
Garlic	3,200	397.75	3,447	697.59
Other spices (b)	15,000	5,350.00	13,147	658.15
Curry powder	3,450	1,745.00	4,053	713.19
Mint oil	2,150	6,000.00	2,140	4,543.63
Spice oleoresins and other oils	1,725	19,747.50	1,632	14,622.87
Total	1,37,495	1,08,591.25	1,70,652	9,990.23

Note : (a) includes aniseed, Bishops weed (Ajowan seed), Dill seed etc

(b) includes tamarind, asafoetida, cinnamon, cassia, kokam, saffron etc.

(*Financial Express*, 17 February 1999,

20)

62 Marine products' export

State	1996-97 Qty in tonnes	1997-98 Qty in tonnes	Growth %	1996-97 Value in Rs Cr	1997-98 Value in Rs Cr	Growth %
Andhra Pradesh	18,560	23,358	25.85	522	774	48.27
Goa	13,602	11,096	-18.42	63	53	15.87
Gujarat	1,23,212	1,25,597	1.93	570	638	11.92
Karnataka	1,715	1,970	14.86	12	5	58.53
Kerala	92,288	89,804	-2.69	936	952	1.70
Maharashtra	71,660	73,468	2.52	518	593	14.47
Tamil Nadu	40,877	40,307	1.39	1,075	1,204	12.00
West Bengal	16,281	13,960	-14.25	422	418	0.94
Total	3,78,198	3,79,585	0.36	4,121	4,642	12.64
In \$millions				1,152	1,280	11.11

(Business Line, 29 June 1998, 8)

63 Cashew exports up 7,600 tonnes in 1997-98

Export of cashew and allied products from the country in the last fiscal netted Rs.1,390.64 crore worth foreign exchange, a record in rupee terms, Cashew Export Promotion Council sources said here.

According to the sources, export of cashew kernels alone registered an increase of 11 percent in quantity terms and eight percent in value terms compared to 1996-97. A total of 76,323 tonnes of cashew kernels valued at Rs.1,383.90 crore were exported during 1997-98 as against 68,663 tonnes, valued at Rs.1,285.50 crore in the previous year.

Among the agricultural commodities exported from India, cashew held fifth position, contributing 1.1 percent of the total export earnings in 1997-98, the sources said. Export of cashewnut shell liquid went up by almost 150 percent in both quantity and value terms in 1997-98.

The sources said 4,181 tonne of shell liquid valued at Rs.6.74 crore was exported during the last fiscal as against 1,735 tonne valued at Rs.2.77 crore in the previous year.

The average unit value realisation of cashew kernels in 1997-98 was Rs.181.32 per kg against

Rs.187.22 per kg in the previous year, a fall of 3.15 percent. Unit value realised for cashewnut shell liquid during 1997-98 was Rs.16.12 per kg.

Cashew exports fell short by just one million US dollar of the \$375 million target fixed by the commerce ministry. The short-fall was attributed to the fall in unit value realisation of over three percent, the sources said.

The sources said during 1997-98, the US continued to be the major buyer, importing 26,509 tonnes of cashew valued at Rs.531.9 crores, 38.4 percent of total exports. Netherlands was the second largest importer of cashew kernels from India with an intake of 18,346 tonnes valued at Rs.328.7 crores, representing 23.8 percent of the exports.

Export of American zone was 39.6 percent, European Zone 40.3 percent, West Asia 6.8 percent and South East and Far East together 10 percent.

On the other hand, import of cashew in 1997-98 was 2,24,484 tonnes valued at Rs.744 crores as against 2,12,866 tonnes valued at Rs.687.6 crores during 1996-97, registering a five percent increase in quantity and eight percent hike in value, the sources said.

Production of raw cashew nuts in the country decreased to 3.6 lakh tonnes in 1997-98 against 4.30 lakh tonnes in '96-97.

{Economic Times, 21 October 1998, 17}

IMPORT

64 Export and import of cashew

Item	Apr-Oct 1997			Apr-Oct 1998		
	Production (Tonne)	Export (Rs. Cr.)	Import* (tonne)	Production (Tonne)	Export (Rs. Cr.)	Import* (tonne)
Cashew Kernels	47407	847.48	108422	47788	972.97	84343
Cashewnut shell liquid	2220	3.32	-	1144	2.12	-

- Import of raw cashews

{The Financial Express, 28 December 1998, 16}

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

65 Health ministry approves manufacture of low-cholesterol 'ghee'

A new product combining the price advantage of vanaspati (hydrogenated oils) and the lower fatty acids quality of refined oils could soon be making a place for itself on Indian kitchen shelf. The Union health ministry has accorded approval for the manufacture of this low-cholesterol, a brainchild of the Vanaspati Manufacturers Association (VMA), sources said. Named 'Randhan' (in sanskrit: to cook), the cooking medium will be available under different brand-names. It is likely to be priced at between Rs. 50-60 a kg which makes it much cheaper than refined oils, sources said.

According to the VMA, which sponsored the research that developed the product, Randhan represents a major technological breakthrough in the edible oils industry which meets India's annual demand of 85 lakh tonne.

The effort is now on to add colour and flavour to the product, say sources. This will enable it to cater to the different taste preferences of consumers across the country. It could, for example, provide the taste of desi ghee or the pungency of mustard oil or the flavour of groundnut oil, according to the additives used.

The VMA is now awaiting health ministry's approval for adding flavour, say sources. Once the permission is obtained, the vanaspati industry will be able to introduce Randhan in two years.

However, it may not be possible to manufacture the product in existing capacities as a different technology is involved. Vanaspati units will, therefore, need to make some minor changes in the machinery to be able to produce Randhan, they added.

The vanaspati industry is also awaiting the review of the Indo-Nepal trade treaty. The existing treaty allows the imports of vanaspati from Nepal at zero duty. This has hurt the units located in the northern and eastern regions as imports from across the border are cheaper by Rs. 50/kg. The VMA has asked the government to put edible oils on the negative list of imports as far as trade with Nepal is concerned.

Meanwhile, the Central government's directive that edible oils be sold only in the packaged form has met with poor results. Andhra Pradesh is the only state to have implemented the packaging order, according to sources. Groundnut and mustard oil extraction, being the sole preserve of the small-scale industry, are produced in villages in ghanis, who do not normally package their product, they added.

{The Economic Times, 19 December 1998,15}

66 Prevention of Food Adulteration (9th Amendment) Rules, 1998

G.S.R.174 (E) – Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 380(E), dated the 10th July 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 10th July 1997 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of sixty days from the date on which the copies of the official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to the public on 24th July, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

- 1 (1) These rules may be called the Prevention of Food Adulteration (9th Amendment) Rules, 1998.
- (2) They shall come into force on the date of their publication in the Official Gazette.
2. In the Prevention of Food Adulteration Rules, 1955, in rule 65, in sub-rule (2), in the Table, -
 - (a) against serial No. 1, -
 - (i) in column (3), after entry “Eggs”, the entry “Fish” shall be added;
 - (ii) in column (4), after entry “0.1 (on a shell-free basis)”, the entry “0.2” shall be added;
 - (b) against serial No.2,-
 - (i) in column (3), after entry “Maize cob (kernels)”, the following entries shall be added, namely:-

“Maize
Rice
Chillies”;
 - (ii) in column (4), after entry “1.0”, the following entries shall be added, namely:-

“0.50

- 2.50
5.00";
- (c) against serial No. 9, -
- (i) in column (3),
after entry
"Cotton Seed Oil
(crude)", the
following entries
shall added,
namely:-
"Bengalgram
Pigeon pea
Fish";
- (ii) in column (4)
after entry "0.2",
the following
entries shall be
added, namely:-
"0.20
0.10
0.20";
- (d) against serial No. 14, in
column (4), the following shall be
substituted, namely:-

Sl.No.	Name of insecticide	Food	Tolerance limit mg/ kg (ppm)
(1)	(2)	(3)	(4)
		"Dried fruits spices	30.00 400.00"

(i) (e) against serial No. 15 against entry "(a) Alfa (α) isomer" in column (2), in column (3), after the entry "Milk (whole)" and its corresponding entry in column (4), the following shall respectively be inserted, namely:-

Sl.No.	Name of insecticide	Food	Tolerance limit mg/ kg (ppm)
(1)	(2)	(3)	(4)
		"Fruits and Vegetable Fish	1.00 0.25"

(ii) against entry "(b) Alfa (β) isomer" in column (2), in column (3), after the entry "Milk (whole)" and its corresponding entry in column (4), the following shall respectively be inserted, namely:-

Sl.No.	Name of insecticide	Food	Tolerance limit mg/ kg (ppm)
(1)	(2)	(3)	(4)
		"Fruits and Vegetable Fish	1.00 0.25"

(iii) against entry "(c) Gamma (γ) isomer" known as Lindane in column (2), in column (3), for entry "Fruits and Vegetable" and its corresponding entry in column (4), the following shall respectively be substituted, namely:-

Sl.No.	Name of insecticide	Food	Tolerance limit mg/ kg (ppm)
(1)	(2)	(3)	(4)
		"Fruits and Vegetable Fish	1.00 0.25"

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

(8) (iv) against entry “ (α) Delta () isomer” in column (2), in column (3), after the entry “Milk (whole)” and its corresponding entry in column (4), the following shall be added, namely:-

Sl.No.	Name of insecticide	Food	Tolerance limit mg/kg (ppm)
(1)	(2)	(3)	(4)
		“Fruits and Vegetable Fish	1.00 0.25”

(f) after serial number 50 and the entries relating thereto in columns (2), (3) and (4), the following shall be added, namely:-

(1)	(2)	(3)	(4)
51.	Alachlor	Cotton seed Groundnut Maize Soyabeans	0.05 0.05 0.10 0.10
52.	Alfa Nephthyl Acetic Acid (A.N.A)	Pine-Apple	0.50
53.	Bitertanol	Wheat Groundnut	0.05 0.10
54.	Captafol	Tomato	5.00
55.	Cartaphydrochloride	Rice	0.50
56.	Chlormequatchloride	Grape Cotton Seed	1.00 1.00
57.	Chlorothalonil	Groundnut Potato	0.10 0.10
58.	Diflubenzuron	Cotton Seed	0.20
59.	Dodine	Apple	5.00
60.	Diuron	Cotton Seed Banana Maize Citrus (Sweet Orange)	1.00 0.10 0.50 1.00
61.	Ethephon	Grapes Pine Apple Coffee Tomato Mango	1.00 2.00 0.10 2.00 2.00
62.	Fluchloralin	Cotton seed Soya beans	0.05 0.05

63.	Malic Hydrazide	Onion	15.00
		Potato	50.00
64.	Metalyxly	Bajra	0.05
		Maize	0.05
		Sorghum	0.05
65.	Methomyl	Cotton seed	0.10
66.	Methyl Chloro- phenoxyactetic Acid (M.C.P.A)	Rice	0.05
		Wheat	0.05
67.	Oxadiazon	Rice	0.03
68.	Oxydemeton methyl	Food-grains	0.02
69.	Permethrin	Cucumber	0.50
		Cotton seed	0.50
		Soya Beans	0.05
		Sunflower seed	1.00
70.	Quinolphos	Rice	0.01
		Pigeonpea	0.01
		Cardamom	0.01
		Tea	0.01
		Fish	0.01
71.	Thiophanatemethyl	Apple	5.00
		Papaya	7.00"

(The Gazette of India (Extraordinary),
Part II, Section 3, subsection (i), No.
114; 1998; 7-9)

67 Prevention of Food Adulteration (4th Amendment) Rules, 1998

G.S.R.175 (E) – Whereas certain rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 148(E), dated the 14th March, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 14th March 1997 at page 1 to 7 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of thirty days from the date on which the copies of the Gazette of India in which the said notification was published were made available to the public;

And whereas the copies of the said Gazette were made available to public on 26th March, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

(1) These rules may be called the Prevention of Food Adulteration (4th Amendment) Rules, 1998.

(2) In the Prevention of Food Adulteration Rules, 1955 in rule 6, in sub-rule (2), in second proviso, in clause (ii), in sub-clause (b), for the figures “31-3-97”, the figures, letters and word “31st March, 1999” shall be substituted.

(The Gazette of India (Extraordinary), Part II, Section 3, Subsection (i); No. 115, 1998, 5)

68 Prevention of Food Adulteration (6th Amendment) Rules, 1998

G.S.R.176 (E) – Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 379(E), dated the 10th July, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 10th July 1997 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of ninety days from the date on which the copies of the official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to public on 15.7.1997

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred sub-section(i) read with sub section (1A) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1 (1) These rules may be called the Prevention of Food Adulteration (6th Amendment) Rules, 1998.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 in Appendix B, in item A 16.16:-

- (i) in sub item (i) for the words, "Pickles shall be free from added salts of copper, alum and mineral acids", the following shall be substituted namely:-
"Pickles shall be free copper, alum and mineral acids";

- (ii) in sub-item (ii), for the words "The Pickle shall be free from added copper, alum and mineral acid", the following shall be substituted, namely:-
"Pickle shall be free from copper, alum and mineral acids";

- (iii) in sub-item (iii) for the words " the Pickle shall be free from added copper, mineral acid, alum or added coaltar colours", the following shall be substituted, namely:-
"Pickle shall be free from copper mineral acid, alum, synthetic colours".

{The Gazette of India Part II, Section 3, Subsection (i), No. 116, 1998, 5}

69 Prevention of Food Adulteration (3rd Amendment) Rules, 1998

G.S.R.177 (E) -

Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 305(E), dated the 4th June, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the

4th June 1997 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of period of sixty days from the date on which the copies of the Gazette of India in which said notification was published were made available to the public;

And whereas the copies of the said Gazette were made available to public on 9th June 1997.

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

RULES

1 (1) These rules may be called the Prevention of Food Adulteration (3rd Amendment) Rules, 1998.

(2) They shall come into force on the date of their publication in the Official Gazette except rules 2 and 4 which shall come into force after six months from the date of their publication.

2. In sub-rule(1) of rule 47 of the Prevention of Food Adulteration

Rules, 1955 (hereinafter referred to as the principal rules), in the Table in the proviso at the end, for the words, brackets, figures, and letters "and may contain carrier or filler articles with label declaration as provided in sub-clauses (1) and (2) of Sub-rule (ZZZ) of rule 42", the following shall be substituted, namely:-

"and may contain the following carrier or filler articles with label declaration as provided in sub-clauses (1) and (2) of sub-rule (ZZZ) of rule 42, namely:-

1. Dextrose
2. Lactose
3. Maltodextrin
4. Mannitol
5. Sucrose
6. Isomalt
7. Citric acid
8. Calcium silicate
9. Carboxymethyl cellulose
10. Cream of Tartar, IP
11. Cross Carmellose sodium
12. Colloidal silicone dioxide
13. Glycine
14. L-leucine
15. Magnesium sterate IP
16. Purified Talc
17. Poly vinyl pyrrolidone
18. Providone
19. Sodium hydrogen carbonate
20. Starch
21. Tartaric acid"

3. In rule 55 of the principle rules,-

- (a) against serial 29, relating to flour confectionery, in

column (2), for the entry, the following shall be substituted, namely:-

“Sorbic acid including Sodium, Pottassium, and Calcium salts (calculated as Sorbic acid)”.

(b) after serial No. 41, and the entries relating thereto, the following shall be inserted, namely:-

(1)	(2)	(3)
“42 Prunes	Potassium Sorbate (Calculated as Sorbic acid)	1000”

4. In rule 57 of the principal rules, in the Table, after serial No.8 and the entries relating thereto, the following shall be inserted, namely:-

(1)	(2)	(3)
“9. Chromium	Refined Sugar	20 ppb:

5. After rule 61 D of the principal rules, the following shall be inserted, namely:-

“61E – Use of Xanthan Gum – Xanthan Gum may be used in food articles upto a maximum extent of 0.5 per cent by weight.”

6. In appendix B of the principle rules, in item A 11.02.18.02 relating to Milk Cereal Based Weaning Foods, in the first paragraph, for the words. “It may also contain fruit and vegetables”, the following shall be substituted, namely:-

“It may also contain fungal-alfa-amylase upto a maximum extent of 0.025 per cent, by weight, fruits, vegetables, egg or egg products”.

(The Gazette of India (Extraordinary), Part II – Section 3 – Sub-section(i), No. 117, 1998, 5-6)

70 Prevention of Food Adulteration (2nd Amendment) Rules, 1998

G.S.R.178 (E) – Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 378(E), dated the 10th July 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 10th July 1997 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of sixty days from the date on which the copies of the Gazette of India in which the said notification was published were made available to the public;

And whereas the copies of the said Gazette were made available to public on 15th July, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1 (1) These rules may be called the Prevention of Food Adulteration (2nd Amendment) Rules, 1998.

(2) They shall come into force after a period of six months from the date of their publication in the Official Gazette.

70 In the Prevention of Food Adulteration Rules, 1955, in Appendix "B", in item A.11.02.17,

(i) For the word "Khoya" the following words shall be substituted, namely:-

"Khoya by whatever variety of names it is sold such as Pindi, Danedar, Dhap, Mawa and Kava";

(ii) For the figures and word, "20 per cent" the following words and figures shall be substituted, namely:-

"30 percent on dry weight basis";

(iii) the following shall be added at the end, namely:-

"It shall be free from added starch, added sugar and added colouring matter".

(The Gazette of India (Extraordinary), Part II – Section 3 – Sub-section(i), No. 118, 1998, 5)

71 Prevention of Food Adulteration (7th Amendment) Rules, 1998

G.S.R.179 (E) –

Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 381(E), dated the 10th July 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 10th July 1997 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of sixty days from the date on which the copies of the official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to public on 21th July, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by Sub-section(i) read with Subsection (1A) of Section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1 (1) These rules may be called the Prevention of Food Adulteration (7th Amendment) Rules, 1998.

(2) They shall come into force on date of their publication in the Official Gazette except rule(c) of rule 3 which shall come into force after six months from the date of their publication.

2. In the Prevention of Food Adulteration Rules, 1955 hereinafter referred to as the principal rules), in rule 49, in sub-rule (16), for the words, "and partly skimmed milk powder", the words, "partly skimmed milk powder and partly skimmed sweetened condensed milk" shall be substituted.

3. In Appendix 'B' to the principal rules,

(a) in item a. 07.01.01 in clause (b), for the words "Sucrose", the words and brackets, "Total sugar (called, known or

expressed as Sucrose)" shall be substituted;
(b) in item A.10.06, for the portion beginning with "Cocoa butter" and ending with "(on moisture and fat free basis)", the following shall be substituted, namely:-

"Cocoa butter-"

- (i) for low fat.....Not less than 10.0 per cent. (on moisture free basis),
- (ii) for high fat.....Not less than 20.0 per cent. (on moisture free basis);
- (c) after item A.11.02.13, the following item shall be inserted, namely-

'A.11.02.13.01-

"Partly skimmed sweetened condensed milk" means the product obtained from partly skimmed cow or buffalo milk or a combination thereof by the partial removal of water and after addition of cane sugar. It may contain added refined lactose, calcium chloride, citric acid, sodium citrate, sodium salts of ortho phosphoric acid and poly phosphoric acid (as linear phosphate) not exceeding 0.3 per cent by weight of the furnished product. Such addition need not be declared on the label. Partly skimmed sweetened condensed milk shall contain not less than 28.0 per cent of total milk solids and not less than 40.0 per cent cane sugar. The fat content shall not be less than 3.0 per cent and more than 9.0 per cent by weight";

(d) in item A.14, in clause (c), for the words and letters, "Ash insoluble in HCl", the words "Ash insoluble in dilute hydrochloric acid" shall be substituted;

(e) in item A.15 and in item A.15.01, for the words "free from visible contamination", the words "free from contamination", shall be substituted;

(f) in item A.18.02, for the words brackets "Maida (wheat flour) means", the words "Maida means" shall be substituted;

(g) in item, A.18.04, in clause(b), for the words and letter "Ash insoluble in HCl", the words "Ash insoluble in dilute hydrochloric acid", shall be substituted;

(h) in item A.18.06.04, in clause (iii) the brackets and words "(excluding discoloured tip)" shall be omitted.

(The Gazette of India (Extraordinary), Part II - Section 3 - Sub-section(i), No. 119, 1998, 5-6)

72 Prevention of Food Adulteration (5th Amendment) Rules, 1997

G.S.R.283 (E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 183(E), dated the 12th April, 1996 in the Gazette of India, Extraordinary,

Part II, Section 3, Sub-section (1), dated the 12th April, 1996 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of hundred and twenty days from the date on which the copies of the official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to public on 26th April, 1996;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1 (1) These rules may be called the Prevention of Food Adulteration (Vth Amendment) Rules, 1997.

(2) They shall come into force after 6 months from the date of their publication in the official Gazette.

71 In the Prevention of Food Adulteration Rules, 1955, in Appendix 'B', after item

A.25.02.01, the following item shall be inserted, namely:

A.25.03 Chocolate – Chocolate means a homogeneous product obtained by an adequate process of manufacture from a mixture of one or more of the ingredients, namely, cocoa (cocoa) beans, cocoa (cocoa) nib, cocoa (cocoa) mass, cocoa press cake and cocoa dust (cocoa fines/powder), including fat reduced cocoa powder with or without addition of sugars, cocoa butter, milk solids including milk fat and non-prohibited flavouring agents. The chocolates shall not contain any vegetable fat other than cocoa butter.

The material shall be free from rancidity or other off odour, insect and fungus infestation, filth, added colouring matter, adulterants and any harmful or injurious matter. Provided that filled chocolates may contain permitted food colours.

The chocolates shall be of the following types:-

Milk chocolate is obtained from one or more of cocoa nib, cocoa press cake, cocoa powder including low-fat cocoa powder with sugar and milk solids including milk fat and cocoa butter.

Milk Covering Chocolate – as defined above, but suitable for covering purposes.

Plain Chocolate is obtained from one or more of cocoa nib, cocoa

mass, cocoa press cake, cocoa powder including low fat cocoa powder with sugar and cocoa butter.

Plain Covering Chocolate – same as plain chocolate but suitable for covering purposes.

Blended Chocolate means the blend of milk and plain chocolates in varying proportions.

White Chocolate is obtained from cocoa butter, milk solids, including milk fat and sugar.

Filled Chocolates means a product having an external coating of chocolate with a centre clearly distinct through its composition from the external coating, but does not include flour confectionery, pastry and biscuit products. The coating shall be of chocolate that meets the requirements of one or more of the chocolate types mentioned above. The amount of chocolate component of the coating shall not be less than 25 percent of the total mass of the finished product.

Composite Chocolate – means a product containing at least 60 percent of chocolate by weight and edible wholesome substances such as fruits, nuts. It shall contain one or more edible wholesome substances which shall not be less than 10 percent of the total mass of finished product.

In addition to the ingredients mentioned above, the chocolate may contain one or more of the substances

as outlined below under different brands of chocolates:-

1. Milk Chocolates, Plain Chocolates, Blended Chocolates, White Chocolates and Composite Chocolates:-

- a. edible salt,
- b. non-prohibited flavouring agents
- c. permitted emulsifying agents
- d. spices and condiments

2. Filled Chocolates:-

- a. permitted antioxidants
- b. permitted emulsifying and stabilising agents
- c. permitted preservatives
- d. permitted food colours and non-prohibited flavouring agents
- e. permitted sequestering and buffering agents
- f. permitted acidulants such as citric acid, tartaric acid, malic acid (food grade).

Chocolates shall also confirm to the following standards, namely:-

Sl. No.	Characteristics	Requirements for					
		Milk Chocolate	Milk Covering Chocolate	Plain Chocolate	Plain Covering Chocolate	White Chocolate	Blended Chocolate
1	Total fat (on dry basis) percent by weight. Not less than	25	25	25	25	25	25
2	Milk fat (on dry basis) percent by weight. Not less than	2	2	-	-	2	-
3	Cocoa solids (on moisture-free and fat-free basis) percent by weight. Not less than	2.5	2.5	12	12	-	3.0

4	Milk solids (on moisture- free and fat-free basis) percent by weight. Not less than / Not more than	10.5 -	10.5 -	- -	- -	10.5 -	1 9
5	Acid insoluble ash (on moisture fat and sugar free basis) percent by weight. Not more than	0.2	0.2	0.2	0.2	0.2	0.2

*(The Gazette of India (Extraordinary),
Part II, Section 3, Sub section(i),
No.205, 1997, 5-6)*

73 Prevention of Food Adulteration (10th Amendment) Rules, 1998

G.S.R.380 (E) – Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published, as required by section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 306 (E), dated the 4th June, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 4th June, 1997 inviting objections and suggestions from the persons likely to be affected thereby before the expiry of a period of sixty days from the date on which copies of the Gazette of India containing in which the said notification was published, were made available to the public;

And whereas the copies of the said Gazette were made available to public on 20th June, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to

amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1) These rules may be called the Prevention of Food Adulteration (10th Amendment) Rules, 1998.

(2) They shall come into force on date of their publication in the Official Gazette, except rule 3, clause (a), clause (c) and clause (d) of rule 4, rule 6 and rule 7 which shall come into force after one year from the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955, (hereinafter referred to as the said rules), in rule 22, in table, in serial number 10, for the words "wheat flour", "wheat flour (maida) and suji" shall be substituted.

3. In the said rules, for rule 24, the following rule shall be substituted, namely:-

"24.Extraneous addition of colouring matter to be mentioned on the label – Where an extraneous colouring matter has been added to any article of food, there shall be displayed a statement in capital letters, just beneath the list of ingredients on the label attached to any package of food so coloured, as below:-

'CONTAINS	PERMITTED
NATURAL*/AND*	SYNTHETIC*
COLOURS'	

(* Strike out whichever is not applicable)

NOTE:-If such a statement is displayed, the colour used in the product need not to be mentioned in the list of ingredients".

4. In the said rules, in rule 32,-

- a) after the proviso to clause (b) the following proviso, shall be inserted, namely:-

"Provided further that when statement regarding addition or colours or flavours are displayed on the label in accordance with rule 24 and rule 64 BB respectively, addition of such colours or flavours need not be mentioned in the list of ingredients:

Provided also that in case both colour and flavour are used in the product, a combined statement in capital letters shall be displayed, just beneath the list of ingredients on the label attached to any package of food so coloured and flavoured, as below:-

**'CONTAINS PERMITTED
NATURAL*/AND*
SYNTHETIC* COLOURS AND
ADDED FLAVOURS'**

(* Strike out whichever is not applicable)".

- b) in clause (f), for the fifth proviso, the following proviso, shall be substituted, namely:-

"Provided also that in case of package or bottle containing sterilised or UHT milk, soya milk, flavoured milk any package containing dhokla, bhelpuri, pizza, dough nuts, khoa, paneer or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the date, month and year in which the commodity is manufactured or prepared or prepacked shall be mentioned, on the label;

Provided also that in case of package containing bread, particulars under this clause need not be specified;

Provided further that in case of package containing confectionery weighing 20g. or less, the particulars under this clause need not be specified";

- c) after clause (h) and before explanation 'I, the following clause shall be inserted, namely:-

"(i) the months and year in capital letters, upto which the product is the best for consumption, in the following manner, namely:-

**" BEST BEFORE UPTO
MONTH AND YEAR....."**

OR
 “ **BEST BEFORE**
WITHIN..... MONTHS
FROM THE DATE OF
PACKAGING /
MANUFACTURE.

(Note: blank be filled up):

Provided that in case of wholesale packages in corrugated boxes and wooden cases, the particulars under clauses (b), (c), (f), (g), (h) and this clause need not be specified;

Provided further that in case of package or bottle containing sterilised or UHT milk, soya milk, flavoured milk, any package containing bread, dhokla, bhelpuri, pizza, dough nuts, khoa, paneer or any uncanned package of fruits, vegetable, meat, fish or any other like commodity, the declaration be made as follows:-

“ **BEST BEFORE UPTO**
DATE/MONTH/YEAR

OR
 “ **BEST BEFORE**
WITHIN..... DAYS FROM
THE DATE OF PACKAGING /
MANUFACTURE.

(Note: blank be filled up):

Provided also that, notwithstanding anything contained the sub-rule (2) of rule 1, in case of the package

containing bread, this clause shall come into force after the expiry of two years from the date of the publication of these rules in Official Gazette:

Provided also that in case of package containing confectionery weighing 20g. or less the particulars under this clause (i) need not be specified;

d) after **explanation I**, the following note shall be inserted, namely:-

“**Note:**In case of any bottle containing liquid milk, liquid beverage having milk as an ingredient, soft drink ready-to-serve fruit beverages or the like which is returnable by the consumers for refilling where labelling declarations are given on the crown, declarations with regard to addition of fruit pulp, juice, colour, flavour and artificial sweetner (whenever permitted under these rules) shall invariably appear on the body of the bottle”;

e) after **explanation V**, the following explanations and Note shall be added, namely:-

“**Explanation VI-** “Wholesale package” means a package containing-

a) a number of retail packages, where such retail packages are intended for sale, distribution or delivery to an intermediary and are not intended for sale direct to any consumer; or

- b) a commodity of food sold to an intermediary in bulk to enable such intermediary to sell, distribute or deliver such commodity of food to the consumer in smaller quantities.

Explanation VII – Prepacked commodity with its grammatical variations and cognate expressions means a commodity of food with or without the purchaser being present, is placed in a package of whatever nature so that the quality of the commodity contained therein has a predetermined value and such value cannot be altered without the package or its lid or cap, as the case may be, being opened or undergoing a perceptible modification.

Explanation VIII –

- (i) “Best Before” means the date which signifies the end of the period under any stated storage conditions during which the product will remain fully marketable and will retain any specific qualities for which tacit or express claims have been made. However, provided that beyond the date the food may still be perfectly satisfactory.

- (ii) In addition to the date of best before, any special conditions for the storage of the food shall be declared on the

label if the validity of the date depends on such storage.

Note - The expression ‘package’, wherever it occurs in these rules, shall be construed as package containing prepacked commodity of food articles”.

5. In the said rules, for rule 36, the following rule shall be substituted, namely:-

“36. Principal display panel, its area, size and letter, etc. – (1) Principal display panel means that part of a label which is intended or is likely to be displayed, presented or shown or examined by the customer under normal and customary conditions of display, sale or purchase of the commodity of food contained in the package.

- (2) The area of the principal display panel shall not be less than-
- a) in the case of a rectangular container, forty percent of the product of height and width of the panel of such container having the largest area.
 - b) in case of cylindrical or nearly cylindrical, round or nearly round, oval or nearly oval container, twenty percent of the product of the height and average circumference of such container; or
 - c) in the case of a container of any other shape, twenty percent of the total surface area of the container except where there is label, surely affixed to the container, such label shall give

a surface area of not less than ten percent of the total surface area of the container.

(3) The height of any numeral in the declaration required under these rules, on the principal display panel shall not be less than –

(4) In computing the area of the principal display panel, the tops, bottoms, flanges at top and bottoms of cans, and shoulders and necks of bottles or jars shall be excluded.

(5) In the case of package having a capacity of five cubic centimeters or less, the principal display panel may be card or tape affixed firmly to the package or container and bearing the required information under these rules.

(j) as shown in Table-1 below if the net quantity is declared in terms of weight or volume.

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TABLE – I

Minimum height of numeral			
Sl.No.	Net quantity in weight/volume	Minimum height in mm	
		Normal case	When blown, formed, moulded, or perforated on container
1	Upto 50g/ml	1	2
2	Above 50g/ml upto 200g/ ml	2	4
3	Above 200g/ml upto 1 kg/litre	4	6
4	Above 1kg/litre	6	8

(ii) as shown in Table-II below if the net quantity is declared in terms of length, area or number.

TABLE – II

Minimum height of numeral			
Sl.No.	Net quantity in Length area and Number, area of principal display panel	Minimum height in mm	
		Normal case	When blown, formed, moulded, or perforated on container
1	Upto 100 cms. Square	1	2
2	Above 100 cms. Square upto 500 cms. Square	2	4
3	Above 500 cms. Square upto 2500 cms. Square	4	6
4	Above 2500 cms. Square	6	8

- (6) The height of letters in the declaration under sub-rule (5) shall not be less than 1 mm height. When blown, formed, moulded, embossed or perforated, the height of letters shall not be less than 2 mm.

Provided that the width of the letter or numeral shall not be less than one third of its height, but this proviso shall not apply in the case of numeral '1' and letters i, I and l:

Provided further that in case of label declarations required under rule 42 except in case declaration specifying instructions for use or preparation of the product, the size of letters shall not be less than 3 mm;

Provided also that the size of letter specified under this rule shall be applicable to declaration made only under rule 32 or 32-A of these rules.

- (6) Every declaration which is required to be made on package under these rule shall be-

- a) legible, prominent, definite, plain and unambiguous;
- b) conspicuous as to size number and colour, and

- c) as far as practicable, in such style or type of lettering as to be boldly, clearly and conspicuously present in distinct contrast to the other type, lettering or graphic material used on the package, and shall be printed or inscribed on the package in a colour that contrasts conspicuously with the background of the label.

Provided that -

- a) Where any label information is blown, formed or moulded on a glass or plastic surface or where such information is embossed or perforated on a package, that information shall not be required to be presented in a contrasting colours;
- b) Where any declaration on a package is printed either in the form of a handwriting or hand script, such declaration shall be clear, unambiguous and legible.
- 8) No declaration shall be made so as to require it to be read through any liquid commodity contained in the package.
- 9) Where a package is provided with an outside container or wrapper such container or wrapper shall also contain all

the declarations which are required to appear on the package except where such container or wrapper itself is transparent and the declarations on the package are easily readable through such outside container or wrapper.”

6. In the said rules, in rule 64 BB for the words, “there shall be written on the label”, the words “there shall be written just beneath the list of ingredients on the label” shall be substituted.

7. In the said rules, after rule 64BB, the following note shall be inserted, namely:-

Note- If such a statement is displayed, the flavour used in the product need not be mentioned in the list of ingredients”.

8. In the said rules, in Appendix B, in item A.29.01, for the words “It shall also be free from Chloral hydrate and paraldehyde”, the words, “It shall also be free from chloral hydrate, paraldehyde, sedative, tranquilizer and artificial, sweetener” shall be substituted.

{The Gazette of India(Extraordinary), Part II, Section 3, Sub-section (i), No.252, 1998, 7-12}

74 Prevention of Food Adulteration (6th Amendment) Rules, 1997

G.S.R.382 (E) – Whereas certain draft rules further to amend

the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (i) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 281 (E), dated the 16th July, 1996 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 16th July, 1996 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of sixty days from the date on which the copies of the Official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to public on 8th August, 1996;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1) These rules may be called the Prevention of Food Adulteration (6th Amendment) Rules, 1997.

(2) They shall come into force on date of their publication in the Official Gazette.

9. In the Prevention of Food Adulteration Rules, 1955, (hereinafter referred to as the said rules), in rule 22B, for the word and figures "rule 22", the words and figures "rule 2 and rule 22C", shall be substituted.

10. After rule 22B of the said rules, the following rules shall be inserted, namely:-

"22 C quantity of samples of food packaging material to be sent to the public analyst - The quantity of sample of food packaging material to be sent to Public Analyst / Director for analysis shall be as specified below:-

Name of food Packaging Material	Approximate quantity / surface area to be Supplied
Food packaging Material of Plastic origin	8 x 1000 x 9 sq. cm. Surface area."

4 In rule 49 of the said rules, in sub-rule (5), -

a) in clause (iv), the figures "1959", at the two places where they occur, shall be omitted.

b) In clause (v), -

i) in sub clause (a), the figures "1982" shall be omitted;

ii) in sub clause (b), the figures "1982" shall be omitted;

iii) in sub clause (c), the figures "1982" shall be omitted;

iv) in sub clause (d), the figures "1984" shall be omitted;

v) in sub clause (e), the figures "1985" shall be omitted;

vi) in sub clause (f), the figures "1986" shall be omitted;

vii) in sub clause (g), the figures "1987" shall be omitted;

viii) in sub clause (h), the figures "1988" shall be omitted;

ix) after sub-clause (h), as so amended, the following shall be inserted, namely:-

"(i) IS 13601 - Ethylene Vinyl Acetate (EVA)

(ii) IS 13576-Ethylene Metha Acrylic Acid (EMAA)."

5. After rule 69 of the said rules, the following rules shall be inserted, namely:-

69-A – Restriction on the use of solvent

- (1) No solvent other than n-Hexane (Food Grade) shall be used in the extraction of cocoa butter, oils and fats and edible soya flour.

The quantity solvent mentioned in the column (1) of the Table below, in the food mentioned in column (2) of the said Table, shall not exceed the tolerance limits prescribed in column (3) of the said Table.

TABLE

Name of solvent	Aritcle of food	Tolerance limits mg/kg (ppm)
(1)	(2)	(3)
Hexane (Food Grade)	(a) Refined Solvent extracted cocoa butter	5.00
	(b) Refined Solvent extracted oils & fats	5.00
	(c) Solvent extracted edible soya flour	10.00

{The Gazette of India (Extraordinary), Part II, Section 3, Sub section(i), No.282, 1997, 5-6}

75 Prevention of Food Adulteration (Amendment) Rules, 1998

G.S.R.482 (E) – The following draft of certain rules further to amend the Prevention of Food Adulteration rules, 1955, which the Central Government, after consultation with the Central Committee for Food Standards, proposes to make, in exercise of the powers conferred by sub-section (1) read with sub-section (1A) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), is hereby published as required by the said sub-section (1) for the information of all persons likely to be affected thereby, and notice is hereby given that the said draft rules will be taken into consideration on or after the expiry of a period of sixty days from the date on which the copies of the Official Gazette in which this notification is published are made available to the public;

Any objection or suggestion which may be received from any person with respect to the said draft rules before the expiry of the period so specified will be considered by the Central Government;

DRAFT RULES

- (1) These rules may be called the Prevention of Food Adulteration (Amendment) Rules, 1997.
- (2) They shall come into force on date of their publication in the Official Gazette.

3. In the Prevention of Food Adulteration Rules, 1955; in Appendix 'B', after item A.18.12 the following shall be inserted, namely:-

"A.18.12.01-Malt-based foods also called malted food means the product obtained by mixing malt (wort or flour or malt extract) of any kind obtained by controlled germination of seeds (Cereals and/or grain legumes), involving mainly steeping germination and kiln drying processes with other cereal and legume flours with or without whole milk or milk powder, flavouring agents, spices, emulsifying agents, eggs, egg powder, protein isolates, protein hydrolysates, edible common salt, sodium or potassium bicarbonate, minerals, amino acids and vitamins. It may contain added sugar and/or cocoa powder and processed in such a manner to secure partial or complete hydrolysis of starchy material in the form of powder or granules or flakes by drying or by dry mixing of the ingredients.

It shall also conform to the following standards, namely:-

a. Moisture	Not more than 5 percent by weight
b. Total Protein (Nx 6.25) (on dry basis)	Not less than 10 percent by weight
c. Total ash	Not more than 5

(on dry basis)	percent by weight
d. Acid insoluble ash (in dilute Hcl)	Not more than 0.1 percent by weight
e. Total plate count	Not more than 50,000 per gram
f. Coliform count	Not more than 10 per gram
g. Yeast and Mould Count	Not more than 100 per gram
h. E.Coli	Absent in 10g.
i. Salmonella and Shigella	Absent in 25g.
j. Uric Acid	Not more than 50 ppm".

{The Gazette of India (Extraordinary), Part II – Section 3 – Sub-section (i) No.293, 1998, 5-6}

76 Prevention of Food Adulteration (8th Amendment) Rules, 1998

G.S.R.465 (E) – Whereas certain draft rules further to amend the Prevention of Food Adulteration rules, 1955 were published as required by sub-section (i) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), No.G.S.R. 279 (E), dated the 16th July, 1996 in the Gazette of India, Extraordinary, Part

II, Section 3, Sub-section (i), dated the 16th July, 1996 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of hundred and twenty days from the date on which the copies of the Official Gazette containing the said notification were made available to the public;

And whereas the copies of the said Gazette were made available to public on 1st August, 1996;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1) These rules may be called the Prevention of Food Adulteration (8th Amendment) Rules, 1997.

(2) They shall come into force on date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as the said rules), in rule 42, after

sub-rule zzz (9), the following shall be inserted, namely:-

“zzz (10) Every package of Bakery and Industrial Margarine made from more than 30 percent of Rice Bran Oil shall bear the following label, namely:-

This package of Bakery & Industrial Margarine is made from more than 30 percent of Rice Bran Oil by Wt.”

3. In rule 49 of the said rules, in sub-rule 22, for the words “margarine”, the words “table margarine” shall be substituted.

4. In Appendix ‘B’ to the said rules, -

a) in item A.08.01, in sub-item 5, in clause (ii), for the figures “4.5”, shall be substituted.

b) in item A.08.04 -

(i) in sub-item (a), for the figure “3.5”, the figures “4.0”, the figure “5.0” shall be substituted;

(ii) in sub item (b), for the figure “15.0”, the figure “12.0” shall be substituted;

b) in item A.1, the word “MARGARINE”, the words “TABLE MARGARINE” shall be substituted;

“A.12.01 Bakery and Industrial Margine – means an emulsion of vegetable oil product with

water. It shall be free from added colour and flavour, rancidity, mineral oil and animal body fats. It may contain common salt not exceeding 2.5 percent, permitted emulsifying and stabilising agents and Butylated hydroxy anisole (BHA) or Tertiary butylhydroquinone (TBHQ) upto a maximum limit of 0.02 percent. It shall conform to the following standards, namely:-

Fat	Not less than 80 percent m/m.
Moisture	Not less than 12 percent and not more than 16 percent m/m

The separated fat of the products shall conform to the following:-

Vitamin A	Not less than 30 IU per gram at the time of packaging and shall show a positive test for Vitamin 'A' when tested by Antimony trichloride (carrier price) reagents (as per IS 5886-1970)
Melting Point by Capillary slip	31C-41C

method	
Unsaponifiable matter	Not exceeding 2.0 percent but in case of the products where proportion of Rice bran oil is more than 30 percent by wt. The unsap matter shall be not more than 2.5 percent by wt. Provided quantity of Rice bran oil is declared on the label of such product as laid down in rule 42.zzz (10)
Free Fatty Acid calculated as Oleic acid or Acid Value	Not more than 0.25 percent Not more than 0.5

It shall contain raw or refined sesame oil (Til oil) in sufficient quantity so that when the product is mixed with refined groundnut oil in the proportion of 20:80, the colour produced by the Boudouin test shall not be lighter than 2.0 red unit in 1 cm. Cell on a Lovibond scale.

Note-For the purpose of this standard, the "vegetable oil product" shall have the meaning assigned to it in Vegetable Oil Product Control Order, 1947".

(The Gazette of India (Extraordinary), Part II, Section 3, Sub-section (i), No.320, 1997, 5-6)

77 Prevention of Food Adulteration (9th Amendment) Rules, 1998

G.S.R.555 (E) – The following draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955, Which the Central Government proposes to make, in exercise of the powers conferred by section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), and after consultation with Central Committee for Food Standards, is hereby published as required by the provisions of said section for the information of all persons likely to be affected thereby; and notice is hereby given that the said draft rules will be taken into consideration on or after the expiry of a period of sixty days from the date on which the copies of the Official Gazette in which this notification is published are made available to the public;

Any objection or suggestion which may be received from any person with respect to the said draft rules before the expiry of the period so specified will be considered by the Central Government;

Objections or suggestions, if any, may be addressed to the Secretary, Ministry of Health and Family Welfare, (Department of Health), Government of India, Nirman Bhavan, New Delhi – 110 011.

DRAFT RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Amendment) Rules, 1998.

(3) They shall come into force on date of their publication in the Official Gazette.

In the Prevention of Food Adulteration Rules, 1955, -

(a) in rule 42, in sub-rule ZZZ, after clause (11), the following clause shall be inserted, namely:-

“ZZZ (12) Every package of food which is permitted to contain a mixture of Aspartame (Methyl Ester) and Acesulfame Potassium Sweeteners mentioned in the Table given in rule 47, shall carry the following label, namely:-

a. This _____ contains
(Name of food)

i) Aspartame (Methyl Ester) _____ ppm; and
ii) Acesulfame Potassium _____ ppm.

b.i) Not _____ for Phenylketoneurics;
iii) Not recommended for children.”

b) in rule 47, after sub-rule (2), the following proviso shall be inserted, namely:-

“Provided that wherein in column 2 of the Table given under sub-rule (1), the use of Aspartame (Methyl Ester) and Acesulfame-K artificial sweeteners have been allowed in the alternative, these artificial sweeteners may be used in combination with one or more alternatives if the quantity of each artificial sweetener so used does not exceed the maximum limits as specified for that artificial sweetener in column (4) of the said Table as may be worked out on the basis of the proportion in which such artificial sweeteners are combined. Food products containing mixture of artificial sweetener shall bear the label as provided under clause ZZZ (12) of the rule 42.

Illustration: In column (3) of the said Table, in carbonated water, Aspartame (Methyl Ester) or Acesulfame Potassium may be added in the proportion of 700 ppm or 300 ppm respectively. If both artificial sweeteners are used in combination and the proportion of Aspartame (Methyl Ester) is 70 ppm, the proportion of Acesulfame Potassium shall not exceed the proportion of 30 ppm.

c) after rule 55-C, the following rule shall be inserted, namely:-

“ 55-D – Use of Nisin as a preservative in Coconut Water Drink – Nisin may be used in prepacked Coconut Water Drink upto a maximum concentration of 5000 International Unit per litre.”

d) after rule 61-A, the following rule shall be inserted, namely:-

“ 61-AA – Use of Modified starches – Modified food starches (derivative starches) may be used in baked foods, confectionery, snacks, flavours, dairy products, glazes, icings, gravies, sauces, soups, fruits filling, coatings, and beverages upto a maximum concentration of 0.5 percent by weight”.

e) after rule 72-B, the following shall be inserted, namely:-

“72-C – Use of Sucrose Acetate Isobutyrate – The maximum concentration of Sucrose Acetate Isobutyrate when used in non-alcoholic beverages as a clouding agent shall not exceed 300 ppm”

f) in Appendix ‘B’, after item A.07.12, the following item shall be inserted, namely:-

“ A.07-13 – Acesulfame Potassium commonly known as Acesulfame-K, having empirical formula $C_4H_4KNO_4S$ molecular weight as 201.24 shall be

the material which is odourless, white crystalline powder having intensely sweet taste and is very slightly soluble in ethanol but freely soluble in water. It shall contain not less than 99 percent, and not more than 101 percent, of Acesulfame-K on dried basis. It shall not contain

more than 3 ppm Fluoride. Heavy metals content shall not be more than 10 ppm. The loss on drying of material at 105° centigrade for two hours shall not be more than 1 percent of its weight”.

{The Gazette of India (Extraordinary), Part II, Section 3, Sub-section (i), No.333, 1998, 5-6}

78 Edible Oils Packaging (Regulation) Order, 1998

G.S.R. 584(E): - In exercise of the powers conferred by section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following Order, namely:-

1. Short title extent and commencement:-

- (1) This Order may be called the Edible Oils Packaging (Regulation) Order, 1998.
- (2) It shall come into force on the date of its publication in the Official Gazette.

2. Definitions – In this Order, unless the context otherwise requires, -

- (a) “Act” means the Essential Commodities Act, 1955 (10 of 1955);
- (b) “Edible Oils” mean vegetable oils and fats and includes any margarine, vanaspati, bakery shortening and fat spread as specified in the Prevention of Food Adulteration Act, 1954 (37 of 1954) and rule made thereunder, for human consumption’
- (c) “Edible Oils Commissioner” means the person appointed as Edible Oils Commissioner by the Central Government and includes any other person empowered by the Central Government to exercise any or all of the functions of the Edible Oils Commissioner under this Order;
- (d) “factory” means any premises including the precincts thereof wherein, or in any part of which one or more of the edible oils is packed or stored for sale;
- (e) “Inspecting Officer” means an Inspecting Officer, appointed under clause 8;
- (f) “label” means any written, marked, stamped, printed or graphic matter affixed to or appearing upon, any container containing any edible oil;
- (g) “registered packer” means a person who has obtained a certificate or registration under sub-clause (4) of clause 4 for carrying on business of packing of any edible oil;

- (h) “registering authority” means any officer of the State Government notified by that Government in the Official Gazette to exercise the powers and functions of a registering authority within the local areas as specified in notification for the purposes of this Order;
- (i) “registration” means registration granted to a packer under clause 4 of this Order;
- (j) “sample” means a sample of any edible oil taken under the provisions of this Order;
- (k) “Schedule” means a Schedule appended to this Order;
- (l) The words and expressions used herein are not defined but defined in the Prevention of Food Adulteration Act, 1954(37 of 1954) and the rules made thereunder have the meanings respectively assigned to them in that Act and rules made thereunder.

3. Prohibition as to sale etc. – On and from the 15th day of December, 1998, no person shall sell or expose for sale, or distribute, or offer for sale, or despatch, or deliver to any person for the purpose of sale any edible oil-

- (a) which does not conform to the standards of quality as provided in the Prevention of Food Adulteration Act, 1954(37 of 1954) and the rules made thereunder; and
- (b) which is not packed in a container, marked and labelled in the manner specified in the Schedule –I;

Provided that the State Government may in the public interest, for reasons to be recorded in writing, in specific circumstances and for specific period by a notification in the Official Gazette, exempt any edible oil from the provisions of this Order.

4. Registration.- (1) No person shall carry on business as a packer except under a certificate of registration granted to him under this Order and in accordance with the terms and conditions specified in the Schedule-III.

(2) Every person who intends to carry on the business of a packer shall make an application to registering authority in the Form specified in the Schedule –II together with the fee to be paid to the State Government, in such manner as may be specified by the State Government;

(3) No person shall be eligible for grant of certificate of registration under this Order unless he has his own laboratory facilities and has appointed in that laboratory at least one chemist having Bachelor of Science Degree with Chemistry as one of the subjects or has made any other arrangement of a common laboratory for such purpose to the satisfaction of the registering authority for testing of samples of edible oils.

(4) After making necessary enquiries, the registering authority may, as he deem fit, issue certificate of registration containing terms and conditions to the applicant as specified in Schedule-III or reject the application, for reasons to be recorded in writing, within ninety days from the date of receipt of application:

Provided that where the registering authority issues certificate of registration under this sub-clause, it shall forward a copy of the certificate of registration to the Edible Oils Commissioner within fifteen days from the date of such registration.

(5) Where a certificate of registration is not granted to a person under this clause, the fee paid by him shall be refunded to him in the manner as specified by the State Government.

5. Requirements to be complied with by the registered packer-(1) No registered packer shall pack any edible oil except under and in accordance with the provisions of the Order.

(2) Every registered packer shall pack edible oils in conformity with the sanitary and other requirements specified in the Schedule-IV

(3) Every registered packer shall, in regard to packing, marking and labelling the containers of edible oils, comply with the requirements specified in the Schedule-I.

(4) Notwithstanding anything contained in sub-clause (1) and (2), the Edible Oil Commissioner may by order published in the Official Gazette, specify any other conditions to be complied with by a registered packer, and it shall be the duty of every registered packer to comply with such conditions.

6. Period validity of certificate of registration.- A certificate of registration, unless sooner suspended or cancelled, shall be valid for a period of three years from the date of registration.

7. Renewal of certificate of registration.-(1) Every registered packer shall make an application for renewal of the registration within the period of sixty days before the date of expiry of the certificate of registration to the registering authority in the form specified in the Schedule-II together with the fee specified by the State Government to be paid to the registering authority in the manner as may be specified by the State Government for such renewal.

- (2) On receipt of an application, under sub-clause (1), the registering authority may renew the certificate of registration for a period of three years at a time.
- (3) Notwithstanding anything contained in sub-clauses (1) and (2), the certificate of registration issued or renewed under this Order shall be valid till a decision on the application for its renewal is taken by the registering authority.

8. Appointment of Inspecting Officers.- The Central Government or the State Government may, by notification in the Official Gazette, appoint such persons as it thinks fit, having the qualifications determined by the Government for this purpose to be Inspecting Officers for such local areas as may be assigned to them by the Central Government or the State Government, as the case may be:

Provided that no person who has any financial interest in the packing of edible oils shall be appointed to be an Inspecting Officer under this Order.

9. Power to carry out inspection, entry and sampling.-(1) The Edible Oils Commissioner and Inspecting Officers of the Central Government as well as of the State Government may enter and inspect any premises or vehicle and seize stocks of edible oils, in respect of which he has reason to believe that a contravention of any of the provisions of this Order has been or is being or is likely to be committed.

(2) The Edible Oils Commissioner or Inspecting Officer may enter and inspect any place where any edible oil is packed, stored and sold and take sample of such oil for examination in the manner as specified by the Central Government in the case of Edible Oils Commissioner and Inspecting Officer appointed by the Central Government or the State Government in the case of Inspecting Officer appointed by the State Government.

10. Laboratory for analysis.-(1) An edible oil sample, drawn by the Edible Oils Commissioner or an Inspecting Officer of the Central or State Government, authorised under this Order, shall be analysed by a laboratory of the Central or State Government or a laboratory authorised for this purpose by the Edible Oils Commissioner.

(2) The laboratory shall make a report to the Edible Oils Commissioner or any Officer or authority of the Central Government or State government authorised in this behalf by the Government as the case may be, of the results of analysis of the sample sent to it for examination.

11. Power to prescribe monthly returns.-(1) Every registered packer shall furnish, by the 7th of each following month, to the State government, a return in

respect of edible oils packed and sold by him during a month in the proforma as specified in the Schedule-V.

(2) The State government shall intimate to the Edible Oils Commissioner information relating to each edible oil packed and sold by the registered packers in the State at the end of each following month in consolidated form.

12. Suspension of certificate of registration.- The registering authority may, after giving the registered packer an opportunity in writing to show cause and after giving him one month's notice, suspend a certificate of registration issued to him under this Order for any breach of terms and conditions of the certificate of registration or for contravention of the provisions of this Order or for any failure to comply with any order, direction or requisition made under this Order.

Provided that where the edible oil being found to contain harmful substances such as, argemone oil, mineral oil, or any other substance injurious to human health, the certificate of registration of the registered packer shall be suspended immediately by the registering authority without issuing a show-cause notice.

13. Appeal.- A registered packer aggrieved by any order passed by the registering authority under this Order may appeal against such order to the State Government within a period of thirty days from the date on which such an order has been communicated to him and the State Government shall give opportunity of being heard to the registered packer and the registering authority before making any decision in such appeal.

14. Power to review.- A review petition may be filed to the Edible Oils Commissioner against the decision of the State Government under clause 13 by any party aggrieved by such decision within thirty days from the date of such decision and the Edible Oils Commissioner shall decide the review petition after giving the parties in such petition the opportunity of being heard.

15. Power to issue directions.- The Edible Oils Commissioner may, if he deems fit for the purpose of giving effect to the provisions of this Order, issue such directions which are not inconsistent with the provisions of the Order.

SCHEDULE - I

[See clause - 5(3)]

Requirements to be complied with in regard to packing, marking and labelling of the container containing any edible oil.

1. Every container in which an edible oil is packed shall bear the following particulars in English or Hindi (Devanagari Script) and in a regional language.

- (a) The name, trade name (if any);
- (b) Name and address of the packer;
- (c) The name/description of the contents;
- (d) The net mass/volume of the contents;
- (e) The batch No. month and year of manufacture; and
- (f) Registration No.

2. The Registration No. shall bear three parts. The first part will be EOP. The second part shall be the name of the concerned State Government. The third part shall be numerical No. given by State Government to the packer.

Illustration : For the State of Uttar Pradesh, it shall be, for example, EOP/UP/001.

3. The type size of the matter and numerals shall be specified under the provisions of the Standards of Weights and Measures (Package Commodities) Rule, 1977.

4. The label shall not contain any statement or claim which is false or misleading in respect of any edible oil contained in the package or concerning the quantity or quality or the nutritional value of such edible oil.

5. Edible oil shall be packed in conformity with the provisions of the Standards of Weights and Measures (Package Commodities) Rule, 1977 and the Prevention of Food Adulteration Act, 1954(37 of 1954) and rules there under.

SCHEDULE – II

[See clauses – 4(2) and 7(1)]

Form

Application for grant/renewal of Certificate of Registration under the Edible Oils Packing (Regulation) Order, 1998 for the period commencing from _____ to _____

1. Name and address of the applicant or registered packer:
2. Address of the factory
 - (i) No. _____ (In case there is no premises No., the boundaries of the site shall be noted)
 - (ii) Municipality/Notified Area/Town Area/Railway Area/
Village of _____
 - (iii) District of _____
 - (iv) State of _____
3. No. _____ and dated _____ (No. of certificate of registration, if any, already granted under this Order).

4. Description* of the edible oils and fats

- (i)
- (ii)
- (iii)

*Insert the name and nature of edible oils and fats for which application is made for grant or renewal of certificate of registration.

5. Period for which certificate of registration is required.

6. Details of the equipment installed for packing of edible oils and fats:

- (i)
- (ii)
- (iii)

7. Details of laboratory testing facilities installed or arrangements made for testing of edible oils and fats as required under sub-clause (3) of clause 4 of this Order:-

- (i)
- (ii)
- (iii)

8. I/We hereby undertake to comply with all the provisions of the Edible Oils packaging (Regulation) Order, 1998.

9. I/We have forwarded requisite fee in respect of grant/renewal of certificate of registration to the registering authority in the manner as specified by the State Government.

(Signature of the applicant/registered packer)

Dated:

Note : Please strike out which is not applicable.

SCHEDULE – III

[See clause – 4(4)]

CERTIFICATE OF REGISTRATION

[Under the Edible Oils packaging (Regulation) Order, 1998]

An application dated_____for grant/renewal of certificate of registration under the said Order having been received from (Name)_____son of _____, resident of _____district of _____in the State of _____, subject to the provisions of the said Order and to the terms and conditions specified below, Shri/M/s. _____(Name and address of the packer) hereby granted renewed certificate of registration No.EOP/_____(Name of State/_____(Numerical No. allotted by the State Government) to carry on the sale of packed edible oils and fats

namely _____ (Insert the name and nature of edible oils and fats for which certificate of registration has been granted), as a registered packer in the premises:

()
Signature of the registering authority

Dated: _____

Terms and conditions of certificate of registration

1. The business premises where the edible oils are stored/packed for sale, shall be maintained in proper hygienic conditions.
2. No registered packer shall employ any person who is suffering from infections/contagious disease which is likely to affect packing in hygienic conditions.
3. Every registered packer shall maintain a register showing the quantity received, packed for sale, and sold, in the form as specified by the State Government and this register shall be produced by the registered packer to the Inspecting Officer on demand for inspection.
4. The registered packer shall pack and sell edible oils which shall be free from any adulterant and labelled in accordance with the said Order.
5. No article which is not intended for human consumption shall be stored or sold in the same premises where such edible oils are stored or packed.
6. The Registration No. shall be displayed prominently at the entrance of the business premises.
7. This certificate of registration shall be valid with effect from _____ to _____ unless previously cancelled or suspended under the provisions of this Order.
8. These conditions of certificate of registration are in addition to the other conditions which may be specified under the provisions of this Order.

{The Gazette of India(Extraordinary) , Part II, Section 3, Sub-section (i), No.370, 1998, 6-11}

79 New order on quality norms of edible oil notified

The Union government has notified a new order to promote development of the edible oil industry and enforce manufacturing and quality standards.

The Vegetable Oil Products (Regulation) Order, 1998, which has come into effect from December 16 covering the whole of the edible oil industry, supersedes the Vegetable Oil Products, (Control) Order, 1947, and Vegetable Oil Products (Standards of quality) Order, 1975, as per a copy of the order available with PTI.

The new order, passed by the food and consumers affairs ministry, also deletes outdated provisions of the previous control orders taking into view the current scenario in the edible oil industry and attempts to promote acceptability of edible oil products to consumers on a wide scale.

A provision requiring vanaspati manufacturers to mandatory use tin containers of ISI specification for packing in the earlier orders has also been deleted.

The new order now requires them to use prime and good quality tins for packing. Reacting to the order, Vanaspati Manufacturers' Association (VMA) said it met the long-standing demand of the industry to simplify and amalgamate rules and regulations governing the industry. VMA Chairman Pramod Duar said

the new order would enable the vanaspati manufacturers to save the costs of getting Bureau of Indian Standards (BIS) certification for tin plates.

"The order will reduce the cost of vanaspati to consumers by Rs 3-5 per 15 kg tin," he said, adding vanaspati units were having to pay a minimum of Rs 36,000 annually for the certification. He said the vanaspati industry in particular was relieved as it was being controlled with multiplicity of orders, rules and regulations. The earlier orders were statutory implemented in case of vanaspati industry, which met only 12 per cent of the country's demand.

{Business Standard, 24 December 1998,11}

80 New and revised Indian Standards

IS 4793:1997 Whole pomfret – Frozen (second revision), Gr.2

IS 12299:1998 Dairy Whitener (first revision), Gr.2

IS 13334:(Part 1):1998 Skimmed milk powder: Part 1 Standard Grade (first revision), Gr.2

IS 14514:1998 Clam meat – Frozen, Gr.1

IS 14515:1998 Fish pickles, Gr.2

IS 14516:1998 Cured fish and fishery products-processing and storage-code of practice, Gr.5

IS 14542:1998 Partly skimmed milk powder, Gr.2
(Standards India, June- July 1998)

81 Ban on mustard, rapeseed oil in vanaspati lifted

The Centre has lifted the ban on use of mustard/rapeseed oil in vanaspati with effect from November 5, Ms.Sushma Nath, Joint Secretary in the Department of Sugar and Edible Oils under the Ministry of Food and Consumer Affairs, announced this at the 52nd AGM of the Vanaspati Manufacturers' Association (VMA) here.

It may be recalled that after instances came to light of adulteration of mustard oil, which caused several deaths in New Delhi last month, the Centre disallowed the use of mustard oil in vanaspati.

However, the use expeller mustard/rapeseed oil in vanaspati would be limited to 20 per cent. The vegetable oil product manufactured with mustard/rapeseed oil as an input would have a label declaring that it is free of aregmone oil.

Explaining the Centre's stand on the Edible Oils Packaging (Regulation) Order, (EOPRO) 1998, Ms Nath said the Edible Oils Commissioner's Office (EOCO) would soon issue detailed guidelines to States for implementation of the order. The order, which would take effect from December 15, makes it mandatory for the edible oil and

vanaspati producers to pack their products. For the purpose, they would be required to be registered with the appropriate State authorities.

The Centre's forthcoming guidelines would also simplify the procedure and reduce duplication of paper work for the units, which are already registered with the EOCO, she explained.

Mr.R.P.Sinha, Secretary, Department of Sugar and Edible Oils, who was to inaugurate VMA's AGM, could not attend. In the written text of his address, read out by Ms.Nath. Mr.Sinha said the Centre had to promulgate EPPRO after the cases were detected of adulteration of mustard oil with argemone oil and there were consequential dropsy cases. The objective was to ensure availability of safe and quality edible oil including vanaspati.

The main features of the order are:

- Edible oils including edible mustard oil would be allowed to be sold only in packed form;
- Packers will have to register themselves with a registering authority;
- Packers will have to have their own analytical facilities or adequate arrangements for testing the samples of edible oils to the satisfaction of the Government;

- Only oils, which conform to the standards of quality as specified in the Prevention of Food Adulteration Act, 1954, and rules made thereunder will be allowed to be packed;
- Edible oils shall be packed in conformity with the Standards of Weights & Measures (Packaged Commodities) Rules, 1977;
- Each container or pack will have to show all relevant particulars so that the consumer is not misled, as also the identity of the packer becomes clear.

Mr. Sinha said the Ministry had also proposed to simplify the Vegetable Oil Products (Control) Order, 1947, and Vegetable Oil Products (Standard of Quality) order, 1967 into one single Order, namely Vegetable Oil Products (Regulation) Order, 1998. "The basic thrust of the order is simplification and transparency in operations, consumer protection through quality assurance reduction in the area of controls and ability to care of the technological innovation," Mr. Sinha observed.

Mr. Pramod Dugar, VMA President, thanked the Ministry for having the vanaspati industry excluded last week from the operation of special additional duty of 4 per cent.

Mr. Dugar while listing the woes of the industry, particularly in the eastern and northern region, called for a review of the provisions of the India-Nepal treaty which had a direct bearing on the operations of vanaspati units. VMA had suggested that vanaspati should be put in the negative list of imports under the treaty and the duty structure altered to minimise the disadvantages of domestic units. To substantiate his contention, he said import of vanaspati had risen from 30-40 tonnes to over 500 tonnes a day.

It was mentioned in the written text of the Secretary's address that as there was merit in the industry's representation on the issue, the commerce Ministry had been urged to take up the matter with the Nepalese authorities. The Commerce Ministry had since brought the matter to the notice of the Government of Nepal. *(Business Line, 8 November 1998,3)*

82 Toxic breakfast

In parts per million	DDT	Alfa-BHC	Gamma-BHC	Aldrin	Dieldrin
Milk	40	0.147	0.021	0.048	0.005
Butter	0.130	0.260	0.090	0.850	0.470
Jam	Trace	0.002	Trace	0.001	0.006
Fruit juice	0.040	0.003	-	0.009	-
Tea	0.024	0.021	0.008	0.007	0.004
Ice cream	0.096	0.080	0.111	0.105	0.103

(The Hindu, 11 October 1998, IV)

NEW INDUSTRIES AND COMPANY NEWS

83 IIM-B to set up info centre for medium, small firms

The Centre for Entrepreneurial Studies (CES) at the Indian Institute of Management, Bangalore (IIM-B), is currently drawing up plans to set up an information centre for small and medium industries. The centre is likely to offer diverse industry-related information to small and medium entrepreneurs.

However, it will not actually act as a databank but will, instead, forward inquiries to relevant authorities, said IIM-B professor (finance) and CES chairperson S Sundarajan.

The centre is likely to hold very specialised data but will have understanding with other databanks to supply general data to the inquiries.

The centre is likely to have "members" who will be offered information, up to a certain level, free of cost. On the basis of the nature of information sought after, certain service charges will be asked for, added S Sundarajan.

However, the charges will differ for members and non-members. The Centre for Entrepreneurial Studies has been partly funded by Canara Bank and the British Council

has helped the centre with exchange programmes, Mr. S Sundarajan said.

The small and medium industries, which do not have a proper access to information, lag behind operators in the global scene.

An extensive information on exports, management laws and related matters will help them compete equally with their foreign counterparts.

{The Economic Times, 27 November 1998,3}

84 National centre for crop forecast set up

The National Crop Forecasting Centre (NCFC) announced by Prime Minister Atal Behari Vajpayee after the November 27 commodity price control meeting with chief ministers has been set up in the ministry of agriculture.

To be under the charge of the economic and statistical advisor to the agriculture ministry, Dr. G.S.Ram, the Centre will prepare crop forecasts on scientific lines. It will generate periodic advance estimates for all important crops including pulses, cereals, oilseeds, cotton, sugarcane, potatoes and onions and provide an effective unified institutional framework for the entire crop forecasting system in the country.

It will act as a Central-level monitoring agency for the latest situation regarding crops, weather,

supply of inputs, pests and diseases and market intelligence.

{*The Economic Times*, 4 December 1998,16}

85 Kerala to set up multi-crore rice mill chain

Kerala government will set up a multi-crore rice mill chain in the paddy belt of the state, according to the top sources in state agriculture ministry.

While the proposed Rs 8 crore cold-chain project under the initiative of Kerala State Horticultural Corporation (Hortcorp) has been shoved to the backburner, the rice mill chain has topped the agenda of state agriculture ministry.

Kerala State Warehousing Corporation, which is the premier paddy procurement agency of the state government, will anchor the running or the rice mill chain, sources told *The Financial Express*.

The government has proposed to commission at least 10 rice mills before the term of ruling Left Democratic Front Government ends, he added.

Steps have been taken to initiate work on rice mills in Thakazhi, Alathur and Vaikom. The Rs 3 crore rice mills will be commissioned in the current financial year.

The state agriculture minister Krishnan Kaniyanparambil had last week announced the government plans to set up a Rs 3 crore rice mill in Malampuzha.

This was being planned in the co-operative sector, he had said.

The rice mill chain project was part of the bumper paddy production proposal put up to the Central Government.

The state government had last month requested the Union minister of state for agriculture Som Pal to sanction the Central assistance for the Rs 385 crore paddy development schemes of Kerala government.
{*The Financial Express*, 19 October 1998,2}

86 National database soon on agriculture

A nation-wide knowledge system that provides on agriculture to help attain sustainable food security will be launched in January, agriculture scientist M.S.Swaminathan yesterday said.

The new system, to be launched on January 5, will concentrate on information empowerment of the socially and economically unprivileged sections of the society, Swaminathan, chairman of M.S.Swaminathan Research Foundation in Chennai and former director general of the Indian Council of Agriculture Research (ICAR), said.

Such a system, developed by MSSRF, would help the nation attain sustainable food security, he said inaugurating the 49th congress of International Federation for Information and Documentation (FID) here.

The information would reach farmers via a network of computers, public telephones and wireless services, he said.

Though the system would initially help farmers of Tamil Nadu and Pondicherry, later on its scope could be widened to meet national demand, the scientist added.

It would provide information on safe drinking water, environmental hygiene, productivity increase through eco-friendly technologies and improved distribution system.

Stressing on the need for such information, he said "Pondicherry government has 145 schemes to help the poor, but about 45 per cent of them do not know about those schemes because of the unavailability of information."

(Business Standard, 16 October 1998,2)

87 Kerafed web site

The Kerala Kerakarshaka Sahakarana Federation (Kerafed), an apex body of the coconut farmers' co-operative, has set up its own web site www.kerafed.com.

The web site, developed by the Centre for Development of Information Technology (C-DIT), an autonomous institution functioning under the control of the Kerala Government, was formally inaugurated by the State Minister for Agriculture, Mr. Krishnan Kaniamparambil at a function here on Wednesday.

The web site was expected to help the farmers' federation to reach out to the world at economical rates and disseminate the latest updated information among the exporters and importers of coconut oil in various countries as also major dealers in upcountry markets, a Kerafed spokesman said here.

Kerafed.com has been visualised in seven different divisions respectively dealing with a profile, facilities, products, services, expansion/diversification plans, marketing network and feedback. Between them these divisions capsule as diverse information as procurement of copra, functioning of the milling plants, capacity of the machines, approved parameters governing the quality of coconut oil and its marketing strategies. Consumers are expected to key in their comments, suggestions and other information in the feedback section and may also place orders for export/import.

The spokesman further said the web site would help the federation to get the minutest feel of the market movements as they happen and thus

fine-tune its strategy to reach out to the global market which it was targeting.

{Business Line, 22 September 1998,14}

PERSONALIA

88 New chairman

Mr.J.Halan, Senior Manager, TANTEA, has been elected Chairman of the Managing Committee of the Coonor Tea Trade Association. Mr. O.R.M Prabhu of M/s J.V.Gokul & Co. was elected Vice-Chairman.

{Planter's chronicle, February 1999, 77}

FORTHCOMING CONFERENCES AND TRAINING PROGRAMMES

89 The third International Chocolate, Candies, Confectionery and Related Products Show is being held at Expo Centre Norte, Yellow Hall, Sao Paulo, Brazil, during April 13-16, 1999.

90 The program committee of the Pennsylvania, Manufacturing Confectioners' Association (PMCA) has announced plans for the PMCA's 53. Annual Production Conference to be held April 26-28, 1999, at the Hershey Lodge and Convention Center, Hershey, Pennsylvania.

91 The 15th International Fair Packaging Machinery, Packaging Confectionery Machinery will be held

at Interpack '99 during May 6-12, 1999, all those wanting to offer their new ideas to an interested audience in the field of packaging machinery, packaging materials and packaging means, as well as confectionery machinery, will meet at Interpack in Dusseldorf between May 6-12, 1999.

More than 2,300 exhibitors show what they have to offer in 15 exhibition halls covering 135,000 m².

For further information contact: Messe Dusseldorf North America, 150 North Michigan Avenue, Suite 2920, Chicago, IL 60601.

92 90th AOCS Annual Meeting & Expo will be held during May 9-12, 1999 at Marriott's Orlando World Center, Orlando, Florida, USA.

For more information contact: General Chairperson: Micheal J.Boyer, Applied Engineering & Science, Atlanta, Georgia, USA.

93 The Global Science Academy an NGO serving Science, Environment and Society, Basti (UP) proposes to organise a National Seminar on 'Water and Sanitation in relation to public health' at Basti on the World Environment Day, June 5, 1999.

Topics proposed to be discussed in technical sessions include: Water and Microbial contamination; Water borne health problems and their control; Sanitation and prevention of infectious diseases; and Problems of

water and sanitation; role of government, scientists and people.

Further details may be obtained from Mr. Anil Pratap Singh, Secretary, Global Science Academy, Malviya Road, Basti-272 001.

94 TAPPI's Corrugated Containers Division has issued a call for papers for the 1999 TAPPI International Corrugated Containers Conference and Trade Fair, Nov. 1-5, 1999 at the Hyatt Regency in Chicago. The conference will focus on engineering developments, corrugated board technical service, fiber-board shipping container testing, human resource development, productivity improvement, flexo printing and graphics, process control and quality assurance, production, safety, and new technology.

Those interested in presenting a paper on one of these topics should contact John Telesca of Southern Container Corp. at 516/231-0444 or by e-mail at john.telesca@so-container.com.

Titles and abstracts are due by April 30, 1999, while final manuscripts are due by July 23, 1999.

95 Lipid forum's 20th Nordic lipid symposium will be held during 13-16, June 1999 in Kolding, Denmark. There will be six parallel sessions covering major areas of oils and fat science and technology and a Jubilee session to discuss future challenges and trends in the marketing legislation and nutritional aspects of lipids in foods.

For further details contact: Kolding Turistbureau, Attention. 20th Nordic Lipid Symposium, Akseltorv 8, DK 6000, Kolding, Denmark.
e-mail: kt@keu.dk

96 The 11th Annual Conference & Exhibition on Coffee will be held at Pennsylvania Convention Centre in Philadelphia, PA during April 30-May 3, 1999.

For further information contact: Speciality Coffee Association of America, One World Trade Centre, Suite 1200, Long Beach, CA 90831-1200. www.scaa.org

97 'A-week' is a joint venture organised by Agromisa and the Institute for Applied Communication and Innovation (ITV). It is an intensive five day practically oriented course on 'participation in local development'.

Date: 19 to 23 April, 1999

Venue: Leur, Netherlands

Cost: To include all meals, overnight stays and course materials for the week; Dfl 2500 (UK L 830) for participants from organisations. Dfl 800 (UK L 270) for individuals.

For further information contact: Agromisa, PO Box 41, 6700 A.A. Wageningen, Netherlands.
E-mail: agromisa@worldaccess.nl

98 Lipid oxidation and antioxidants short course will be held during May 6-8, 1999 at Marriott's Orlando World Center Orlando, Florida USA.

be held during May 6-8, 1999
at Marriott's Orlando World
Center Orlando, Florida USA.

99 INFRUITEC in South Africa offers training in fruit processing covering aspects like drying techniques, fruit preparation, sulphuring techniques, hygiene and production of fruit products like jams, leather and chutney.

For further information contact INFRUITEC, Private bag X5013, 7599, Stellenbosch, Republic of S.Africa.

100 The Indian Institute of Spices Research, a Constituent body of the Indian Council of Agricultural Research, conducts training programmes every year on production, management, biotechnology and post-harvest technology of spices for the benefit of planters, farmers, research workers, entrepreneurs and research scientists/teaching faculty.

Those interested in obtaining complete details of the Courses, may write to : The Director, Indian Institute of Spices Research (IISR), P.B.No. 1701, Marikunnu Post, Calicut - 673 012, Kerala, India. Fax: 0091-495-37294, E-mail: iirspices@x400.nicgw.nin.in / nrcp@ren.nic.in

NEW PERIODICALS

101 Food innovation bulletin

Leatherhead Food RA has introduced a new bulletin on the subject of product development in the food and drinks sector. *Food Innovation Bulletin* is a monthly publication which provides informed commentary on trends in new product development on UK branded and own-label products, as well as discussing significant activity overseas. Also available as a supplement to the bulletin are detailed product listings of the previous month's launches, taken from *Leatherhead's Food Launch Awareness in the Retail Sector* (FLAIRS) new products databank.

Subscriptions available from Publications Department, Leatherhead Food RA, Australia.

SPECIAL ARTICLE

Mushrooms – for many uses *

Mushroom is a simple form of fungus. It lacks chlorophyll and cannot therefore make its own food. It grows on dead organic matter or parasitically or symbiotically with other organisms. This constitutes an excellent means of recycling many of the farm wastes. Modern mushroom cultivation produces more proteins per unit area of land than by any other form of agriculture. Since these are grown indoors, no additional land is required for the cultivation. Therefore mushroom cultivation is labour intensive and can provide employment to both educated and illiterate persons. They can be produced in large quantity within a short time. The efficiency with which mushrooms convert carbohydrates into proteins is about 65% in comparison to about 20% for pork, 15% for poultry and 4% for beef.

More than 2000 species of fungi are reported to be edible throughout the world. In India about 200 of these are available. Eight of these have been cultivated so far. In all, about two dozen mushrooms have been cultivated for edible purposes in different countries. *Agaricus bisporus* (European or white button), *Volvariella sp* (Paddy straw or Chinese), *Pleurotus sp* (Oyster or tropical) and *Lentinus edodes* (Shiitake) mushrooms are the most popular ones among the commercial growers. Of these, the first three are popular in India as techniques for their cultivation have been developed. In addition, *Agaricus bitorquis* (Edulis), *Pholiotanemeko*, *Tricholoma matsutake*, *Stropharia rugosoanulate*, *Temella fusiformis*, *Coprinus fimetarius*, *Auricular polytricha*, *Agrocybe egerita* and *Tuber melanospermum* are also being cultivated in different countries.

The total production of mushrooms in India is 11,600 tonnes. Uttar Pradesh, Himachal Pradesh, Haryana, Tamil Nadu and Punjab are the leading states and Rajasthan, Bihar and West Bengal are the least producing states.

There are a number of mushrooms which are poisonous. It is often very difficult to identify the edible mushrooms from the poisonous ones. There are no

*('Food Digest' acknowledges the authors Dr(Mrs) Vijaya Khader, P.Shobadevi, G. Sarojini, J. Alakananda and Nayana Pandya of the Centre of Advanced Studies, Hyderabad, for their permission to reproduce the article)

prescribed standards to identify them. Some tests are often suggested, but none are reliable. It is stated that silver spoon or silver coin would turn blackish when they are dipped in a dish of poisonous mushrooms. Exudations of milky substances from damaged fruit bodies, unusual changes in colour of onion while cooking with mushrooms etc., are some tests mentioned. Some of the highly poisonous ones are – *Amanita phalloides* (death cap), *A. pantherina* (panther cap), *A. muscaria* (fly agaric), *Inocybe pattouillardi*, *Cortinarius speciosissimus*, *Clavellanus* etc.



Cultivation

Oyster mushrooms grow easily at 20-25° C and can take a lesser time to reach maturity than others. Oyster mushrooms can be cultivated for the family table. Since the harvest is quite bountiful, it can also prove to be a profitable hobby.

Things needed include a tub, a few polythene bags (14 inches by 24 inches for home cultivation) and about 3 kgs of paddy straw. The seeds, called the spawn, are available at any nursery or with horticulturist, or pathologist.

Paddy straw is cut into two to three inches and soaked in tap water for 10 hours. Soaked paddy straw bits are drained well and boiled in fresh water for 45 minutes (sterilization). After sterilization, the paddy straw bits are drained of excess water and dried in shade. The straw bits are arranged in layers of 3 or 4 inches at the bottom of polythene bag. Two table spoons of spawn is sprinkled all along the periphery, like a border. This process is operated till the bag is filled and

the mouth of the bag is tightly tied which is known as 'bed'. Two or three holes are made at the bottom of the bag for aeration. The beds are kept in cool and shady place (never in direct sunlight) for 15-20 days. During this period there will be mycelium growth. After 20th day polythene covers are removed. Mycelium growth has fused all layers of straw together into one compact cake-like block. A little water is sprinkled on it twice a day. At about 3rd or 4th day after opening the bag, oyster-like mushrooms sprout all around the bed. Fully grown mushrooms are harvested after 3 days. One bed will yield 4 to 5 crops.

Paddy husk as a substrate for cultivation of *Plurotus Sajor-Caju*

Different substrates have been tried for the cultivation of several species of *Plutorus* in India and abroad. Mushrooms are cultivated on two different substrates such as paddy straw and paddy husk in the Department of Foods & Nutrition, College of Home Science, Bapatla. The results indicate that the yield obtained from paddy straw was high (500g/ bed) as compared with paddy husk (400g/ bed). Paddy straw is considered as the best substrate for cultivating *Plurotus Sajor-Caju* in terms of yield. As the cost of the paddy straw is increasing day by day it is advantageous to find out a low cost and alternate substrate for mushroom cultivation.

Economics

Economics of mushroom cultivation mainly depends on the equipments, nutrients used, their initial cost and yield performance. The expenditure for preparing the mushroom bed is Rs. 10-15 which include the cost of the straw, polythene bags, expenditure towards labour charges, spawn and miscellaneous. One bed gives 1-2 kg of mushrooms from four pickings within a duration of 4 weeks. The market price varies between Rs. 20-40/ kg from place to place. The net income varies depending on the sale price of the spawn. If the sale price is Rs. 30/ kg of mushroom the net income per bed after deductions is Rs. 40-70. In the rural areas a women can easily manage 4-10 beds depending on the space available, helping them to earn Rs. 180 to 450 per month as a supplementary income.

Nutritive value of mushrooms

Mushrooms are considered as delicacy as well as a good supplementary item of food. From the nutritional point of view, they are in between meat and vegetables (Tables 1 & 2). They provide high quality proteins and are low in calories. Hence, it is recommended as a special item for therapeutic use.

The protein in mushroom is rich in all the essential amino acids required by an adult. Some of the amino acids like tryptophan and lysine, which are absent in

vegetable proteins are present in mushroom protein. Approximately 25-35 per cent of total amino acid occur as free amino acids. They are also known to be excellent sources of riboflavin, niacin and pantothenic acid. The crude fat in mushrooms constitute less than one per cent. Mushrooms also contain appreciable amount of thiamine, folic acid and ascorbic acid. They are rich in minerals, and the mineral content in fresh mushrooms is higher than in many fresh vegetables and fruits. Phosphorus and potassium are the main constituents, where as copper and iron are also present in appreciable amounts.

Table 1

Proximate content of edible mushrooms – (Percentage fresh wt. basis)

Species	Moisture	Ash	Protein	Fat	Crude fibre
<i>Agaricus bisporus</i>	89.5	1.25	3.9	0.19	1.09
<i>Lepiota species</i>	90.0	1.09	3.3	0.18	0.86
<i>Pleurotus sp.</i>	90.0	0.97	2.8	0.65	1.08
<i>Termitomyces sp.</i>	91.3	0.81	4.1	0.22	1.13
<i>Volvariella volvacea</i>	88.4	1.46	5.0	0.74	1.38
<i>V.diplasia</i>	90.4	1.10	3.9	0.25	1.67

Table 2

Vitamin and mineral content of edible mushrooms (mg/100g dry wt.)

Species	Thia-mine	Ribofla-vin	Niacin	Ascorbic acid	Ca	P	Fe	Na	K
<i>Agaricus bisporus</i>	1.1	5.0	55.7	81.9	23	1429	0.2	-	4762
<i>Lentinus edodes</i>	7.8	4.9	54.9	0.0	33	1348	15.2	837	3793
<i>Pleurotus ostreatus</i>	4.8	4.7	108.7	0.0	98	476	8.5	61	-
<i>Volvariella volvacea</i>	1.2	3.3	91.9	20.2	71	677	17.1	374	3455

Nutritive value of oyster mushroom at three different stages of maturity

Mushrooms were collected from two different places and analysed for nutrients like protein, fat, crude fibre, ash, calcium, iron, phosphorus and energy for the different stages of both white and grey varieties of oyster mushroom as per the standard methods of A.O.A.C. Carbohydrate content was calculated.

White and Grey varieties of oyster mushrooms were used in the present study. Three different stages of maturity such as immature (two days before

harvesting), mature (at the time of harvesting) and dried (matured and sun-dried) stages were used.

Significant difference was observed between white and grey varieties of mushrooms with respect to their nutrient content, except crude fibre. No significant difference was observed between immature and mature stages of both varieties. Dried mushroom contain high nutrient contents when compared with immature and mature stages because during drying process the food also loses moisture and there is an increase in concentration of nutrients in the remaining mass.

Bio-availability

Studies on *invivo* digestibility of mushroom protein carried out on young male albino rats at 10% level of protein digestibility 87% of overall digestibility of mushroom protein as against 93% for edible soya bean cake, which is significantly different at 5% level. Apparent digestibility of mushroom protein is very low (37%) as compared to edible soya bean cake (84%) which may be due to use of raw dried mushroom powder being used in rat diets.

Effect of cooking on nutritive value

Moisture and vitamin C content decreased on maturation of *Volvariella volvacea* mushrooms (paddy straw). Mature buttons were cooked by three common methods namely (a) boiling in water for 10 min (b) shallow frying in refined oil and (c) deep frying in refined for 10 minutes. Among the three methods of cooking, the loss of nutrients were more in shallow frying, followed by deep frying and minimum in boiling. Vitamin C losses varied from 50-75% based on the type of cooking. Heat treatment did not affect the crude fibre, fat and ash contents.

Therapeutic uses

There are many therapeutic effects attributed to mushrooms. It is true that only a fraction of this has been so far exploited. Many of the folklores in different countries provide ample evidence for the therapeutic use of mushrooms from very ancient times.

Hypolipidemic action

Inclusion of paddy straw mushroom powder in the hypercholesterolaemic diets, (64% starch; 10% groundnut oil; 15% protein; 4% salt mixture; 1% yeast powder; 5% cellulose and 1% cholesterol) reduced the plasma total lipid, total cholesterol and glyceride level significantly whereas free fatty acids and phospholipid levels were not much affected. The lowering of total cholesterol (TC)

level was equally reflected both in HDL and LDL+VLDL fractions. Hypolipidemic action of *Volvariella volvacea* could be due to the increased catabolism or decreased absorption as evident by the lower plasma levels without lipid accumulation in liver inspite of higher cholesterol intake.

Heart lipids (total lipid, cholesterol, free fatty acids, phospholipids and glycerides) decreased with inclusion of mushroom powder. But effect was significant only in case of glycerides and phospholipids. Moreover, the lipid lowering was more evident only at 5% level of mushroom powder in the diet than that of 10% level.

Hypoglycemic action

The effect of fibre from oyster mushroom, spinach and isabgol on blood glucose response was studied in twenty four non-insulin dependent diabetic patients (NIDDM) from a diabetic clinic. The experimental diets include a normal breakfast, *pulkha*, mushroom powder incorporated *pulkha*, spinach powder incorporated *pulkha* and isabgol incorporated *pulkha*. Two levels of fibre i.e., 10% and 15% were studied. The breakfast was served with cucumber curry and a cup of coffee make with skim milk powder without sugar for a period of three days. Blood samples were drawn before and after fibre rich breakfast consumption and analysed for plasma glucose. Mean peak rise over fasting was significantly lower when compared with the test and normal(low fibre) breakfast. Of the two fibre levels tested 15% fibre from mushroom was found to be effective.

Weaning foods

Mushroom powder can be effectively incorporated in weaning foods which serves as useful protein source and also contributes major nutrients like proteins and calcium.

The chemical analysis indicate that the weaning food I is better as compared with other two weaning foods in respect of protein, fat, calcium and calorific value. All the three weaning foods are quite acceptable without any remark. The keeping quality of weaning foods was quite satisfactory up to a period of five months, as indicated by the acceptability studies. The microbiological observations showed no drastic changes in the weaning foods at the end of the fifth month.

Preparation of Weaning foods with mushrooms

WEANING FOODS

Weaning food I

Puffed rice powder	-	20g
Whole Bengal gram (germinate, dried and roasted)		20g
Mushroom powder	-	20g
Jaggery	-	10g
Cardamom	-	One

Preparation : Above ingredients were Mixed thoroughly and packed in a clean dry glass bottle with cover.

Weaning food II

(a)		(b)	
Rice powder	- 40g -	Korra powder	
Red gram dhal powder	- 10g -	Green gram dal powder	
Bengal gram dal powder	- 10g -	Bengal gram dal powder	
Mushroom Powder	- 40g -	Mushroom powder	

Preparation : The cereal or millet, pulse and Mushroom powders were mixed and batter was prepared, fermented overnight. Jaggery 10g, salt to taste and pinch of soda were added and mixed well and baked at 150° C for 10-15 minutes. Allowed to cool at room temperature dried well and powdered, packed in a clean dry glass bottle with cover.

Culinary uses

With the idea of popularising the mushrooms among the local communities, some recipes have been prepared and evaluated for their acceptability. The overall acceptability of chutney powder was excellent compared to pickle and ketchup. The keeping quality of the preparation were good upto a period of 2 months. Subtle in flavour, characteristic of biting, texture and attractive in appearance, mushrooms lend themselves to several dishes, some of which are: *Mushroom soup, Mushroom curry, creamy Mushroom, Mushroom pizza, Mushroom stuffed capsicum, Mushroom pan cakes, Mushroom pakoda, Mushroom omlette, Mushroom sandwiches, Mushroom Ketchup, Mushroom chutney, Mushroom pickle, baked Mushroom, Mushroom flavoured rice, Mushroom garlic sauce, Mushroom flakes, Mushroom chips and Mushroom instant soup powder*. They also go well with *noodles, macaroni* and vegetables like cauliflower, peas, potatoes and tomatoes.

On account of being cereal based, Indian diet suffers from inadequate protein content. Mushroom protein has been universally accepted to be superior to

vegetable proteins and as good as animal proteins. Mushrooms are therefore, recognised as non-conventional source of protein which can bridge the protein gap in the Indian diet. Mushrooms are essential supplements to the cereal based diet and go a long way in making it a healthy diet. As, it is rich in fibre, low calorific value and absence of cholesterol, mushrooms find application in diet therapy (treating obesity, diabetes and various heart diseases).

Pickle

The most common method of preserving mushroom is preparation of pickle. Two types of pickles can be prepared by using fresh mushrooms. The details of preparation are as follows:

Pickle I	
Mushroom	125g
Cumin seed powder	½ tsp
Fenugreek seed powder	½ tsp
Coriander seed powder	½ tsp
Turmeric powder	½ tsp
Mustard seed powder	½ tsp
Green chillies	5 Nos
Vinegar (Commercial)	45 ml
Sesame oil	45 ml
Salt	To taste

Pickle II	
Mushrooms	125g
Mustard seed powder	½ tsp
Turmeric powder	½ tsp
Chilli powder	½ tsp
Salt	½ tsp
Asafoetida	Pinch
Sesame oil	30 ml

Mushrooms are fried in oil and all the spice powders were mixed well. Pickles were kept at room temperature for a period of 5 months and regular observations were carried out to see the shelf life. Acceptability studies indicate that the scores for taste, flavour and overall acceptability for both the pickles are markedly different from each other. The second pickle stored well for 5 months without fungal growth. The first pickle got spoiled with in a week. The microbiological observation of spoiled pickle showed the presence of *Streptococci* and *Staphylococci*.
(Reprinted from *Food and Nutrition News*, 3(1), 1998)

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2. Periodicity of its publication.....: Quarterly
3. Printer's Name.....: Director, CFTRI, Mysore
Nationality.....: Indian
Address.....: Director
Central Food Technological Research
Institute, Mysore – 570 013.
4. Editor's Name.....: H.Y.Mahakuteshwar
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Address.....: Director
Central Food Technological Research
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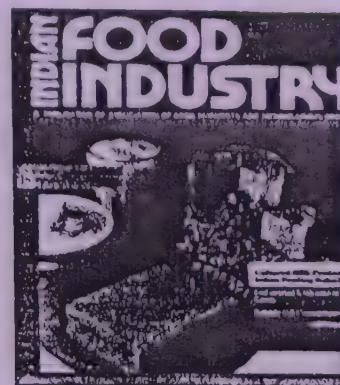
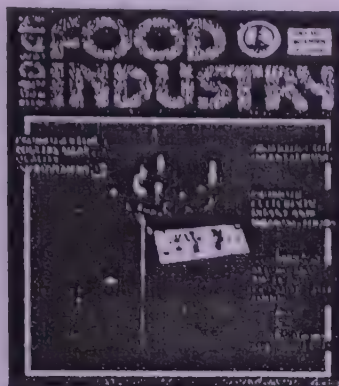
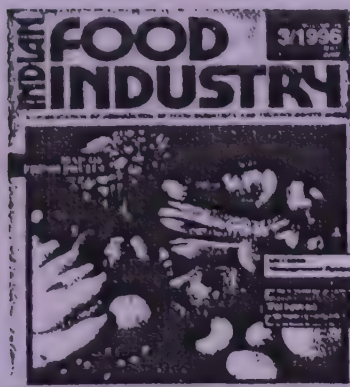
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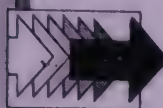
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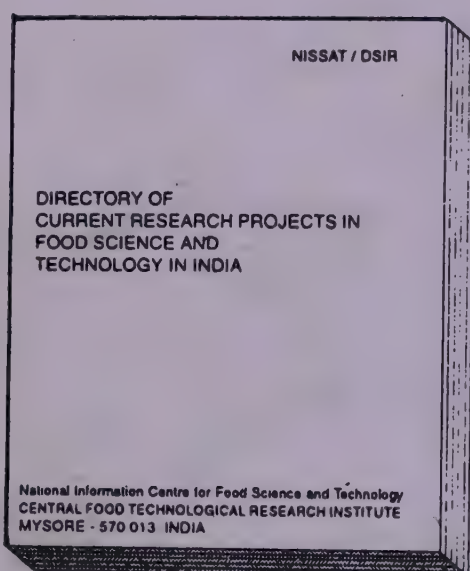
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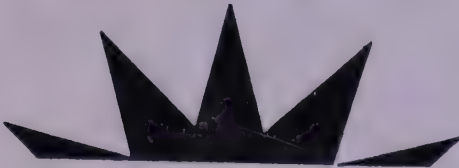
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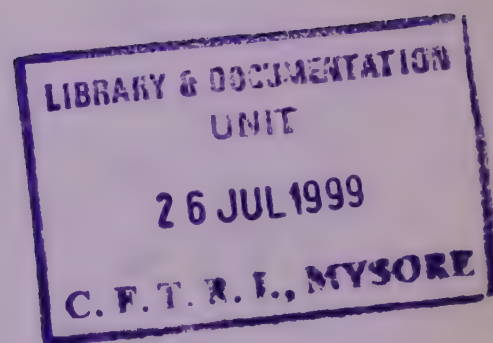
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RAW MATERIALS

102 Iron-rich rice

Rice grains rich in iron content would go a long way in improving the nutrition of large numbers of people. With an estimated 30 per cent of the world's population suffering from some level of iron deficiency, getting enough iron in the diet is a serious nutritional problem.

Although some green vegetables such as spinach, and legumes such as peas and beans, contain plenty of iron, rice along with other staple grain crops, has relatively little. One possible way of upping the iron content of rice-eaters is described by Fumiyuki Goto from the Central Research Institute Electric Power Industry and colleagues from other Japanese biotechnology institutes. By taking a soybean gene for the iron-storage protein ferritin and transferring this gene into rice plants they have produced grains of rice containing up to three times as much iron as usual.

All living organisms, from bacteria to people, need iron since atoms of iron are incorporated into many essential enzymes and other proteins. Humans in particular need quite large amounts of iron in the diet as it is a vital constituent of the red blood cell protein haemoglobin, which carries oxygen around the body. Since we make and discard millions of red blood cells each day, a lack of dietary iron soon leads to anaemia. In

humans, iron is also stored by ferritin in the liver.

Ferritin is a good form of iron storage as each molecule of the protein carries several thousand atoms of iron. Each haemoglobin molecule, on the other hand, contains just four atoms and most other iron-containing proteins, just one or two. Since the only part of a rice plant that people eat is the grain, Goto and colleagues engineered their soybean gene so that it only directed the production of ferritin in the seeds. They did this by hitching the DNA that encodes the ferritin protein to a piece of regulatory DNA that normally directs the synthesis of a rice protein, glutelin, that is only produced in the seeds. The researchers estimate that a meal-sized portion of "ferritin rice" could supply up to 30-50 per cent of the daily adult iron requirement.

(The Hindu, 4 March 1999, 21)

103 Basmati-type rice developed

After 15 years of research and experimentation, a new variety of Basmati-type rice will soon be released by the California Cooperative Rice Research Foundation to meet the expanding palates of US citizens.

A product of the work of Mr. Shu-Ten Tseng, a plant breeder who has worked at CCRRF for 28 years, the "96-Y-90" variety has no other name as yet.

(Pestology, 23(1), 1999, 62)

104 Winged bean, a protein-rich tropical legume

Winged bean (*Psophocarpus tetragonolobus*) is a protein-rich legume, and the long pods with tender wing-like out-growths, are eaten as vegetable and also as dried beans. A native of Asia, it is grown in different parts of Philippines, Indonesia, Malaysia, Papua New Guinea, and several parts of India. Crop scientists have listed this bean as one of the neglected tropical legumes.

The robust, twining bushy plant of winged bean grows to over five meters, and it produces immature pods, which are the most widely eaten part of the plant, in two to three months of planting. The yield will continue for about five months. The tender pods are rich in proteins, carbohydrates and fibres.

The tender green leaves, young shoots and flowers of winged bean are also cooked as vegetables. They are good sources of protein and vitamins A and C. Mature seeds can be harvested after 180 to 270 days of sowing, and they can be eaten after frying or roasting. The seeds can also be steamed and made into tofu or milk. The seeds contain 29 to 37 per cent proteins and 15 to 20 per cent edible oil. When combined with corn, the seeds have a nutritive value as high as skim milk.

The hard coat of the brown seeds may require a long cooking time. A simple method of cooking the seeds

after soaking them overnight along with small quantities of baking soda will reduce the time considerably. The seeds contain good amounts of iron and calcium.

The vines produce starchy underground tubers in some cases. These tubers are eaten like potatoes, and are harvested at 120 to 240 days after planting. The tuber formation is common in Papua New Guinea, where the plants yield beans of up to 45 cm long. In the Philippines, the tubers are relatively small, and it is not eaten. The plants yield pods of over 38-cm length here. In India, winged bean is grown in some villages of Tamil Nadu and Andhra Pradesh, but the pods are of smaller size.

{The Hindu, 4 March 1999, 24}

105 Vitamin-rich curry leaves

Walekar, a farmer from Otur near Junnar in Maharashtra has developed a new variety of curry leaf named 'Suvasini'. It has more vitamins and superior aroma. About 30,000 saplings of the new variety are ready for further intensive cultivation and sale.

The new variety has smaller leaves than the traditional one. They are thin, soft and are rich in aroma. Productivity is higher due to more leaves per stalk as compared to the older variety. The tree develops new branches after harvesting the stalks and as a result produces more leaves in the year. The plant can survive

only on rainfall after the first two years.

The agricultural researchers working at the Central Research Institute for Dry land Agriculture, Hyderabad, have developed a simple and low cost technology to produce dry curry leaf powder. The technology can improve the lot of dry land farmers who take to curry leaf cultivation on a plantation basis. Botanically, curry leaf is known as *Murraya koenigii* and belongs to the citrus family of *Rutaceae*. The leaves are generally sold fresh in the market. But they can also be processed and powdered to make value-added product, for which there is a good demand outside India.

Curry leaves contain minerals like calcium and magnesium. They also contain vitamin C. The new variety has all of them in larger quantities. The leaves are not perishable. If the price goes down, the farmer can wait for a couple of months when the prices go up once again. The plant is not subject to attack by many pests and diseases.

{Science Express, 23 March 1999,8}

106 Genetic engineering to make low-lactose milk

Relief could be at hand for the millions of people forced to avoid dairy products because they can't digest lactose, the principal sugar in milk. By putting a rat gene into mice, French researchers have produced

mouse milk that has between 50 and 85 percent less lactose than normal.

If they can do the same with dairy cattle, they hope to mass-produce milk on farms that is low in lactose. "We hope to do it in cows next," says Jean-Noel Freund, leader of the team which produced the mice at the Strasbourg laboratories of INSERM, the French medical research agency.

The market for low-lactose milk could be huge. Lactose intolerance affects 70 per cent of the world's adult population. Most caucasians are unaffected, but according to the US National Institutes of Health some 90 per cent of Asians suffer from the condition, as do three-quarters of Africans and half the world's Hispanic people. As many as 50 million Americans are estimated to have the condition.

Most symptoms start in childhood, when sufferers can't produce enough lactase, the gut enzyme which splits lactose into its constituent sugars, glucose and galactose. So lactose builds up, triggering diarrhoea and painful bloating when gut bacteria digest the lactose, creating intestinal gases.

Not surprisingly, people with lactose intolerance shun lactose-rich foods. The alternatives include taking capsules of lactose-degrading enzymes before meals, or adding drops of the appropriate enzymes to milk. Milk low in lactose is available, but to

produce it milk must be processed with enzymes or spun in a centrifuge, so it's not cheap.

Freund and his colleagues introduce a gene into mice that manufactures lactase-phlorizin hydrolase, the rat equivalent of human lactase. To this gene they attached the alpha-lactalbumin promoter, a genetic switch which confined production of the enzyme to the mammary glands of the mice.

Analysis of milk from the mice confirmed that lactose content had dipped by between 50 and 85 per cent. Traces of the active enzyme were found on fatty milk globules, but Freund doubts whether such enzymes will pose any hazards. The pig and cattle equivalents of the enzyme are already widely consumed in meat products without ill effects. "The enzyme would not be dangerous," says Freund. And rat genes would not have to be used in cows. "The human and pig genes for lactase are already cloned, so you could use them instead," he says. He could not, however, say whether cutting down lactose would affect the taste of milk. "This can't be tested very easily in mice milk," he says.

Jackie Berning, a lactose intolerance specialist at the University of Colorado, says that if the procedure could be repeated in cows, then lactose-intolerant women, who are at the risk of osteoporosis, could benefit from drinking the low-lactose product. But she warns that the new

milk may be too sweet for some palates.

{New Scientist, 6 February 1999, 14}

107 Genetically engineered human milk protein

Scientists have genetically engineered the major and most important protein in human milk, which may pave the way for making infant milk formulas similar to mother's milk. Almost three-quarters of the proteins in mother's milk comprise beta-casein which is responsible for many of its beneficial properties. Because of beta-casein, mother's milk is converted into a fine and soft curd in the baby's gut and is easily digested. Artificial milk substitutes are difficult to digest as they lack this protein and are based on another protein lactoglobulin present in cow's milk.

Beta-casein has been shown to have several positive effects – it helps in secretion of gastric acid which is needed for digestion, improves appetite, has anti-bacterial properties and regulates immunity, Satish Sood, a scientist from the department of biochemistry at Loma Linda University in California in the U.S., told the Science Congress held in Chennai. His team chemically synthesized the gene responsible for making beta-casein and transferred it into a plasmid. The plasmid served as an efficient vehicle to carry the beta-casein gene into *Escherichia coli* cells. The gene integrated with the genetic material of *E.coli* which multiplied

rapidly, producing many copies of the beta-casein gene. The method helps produce beta-casein protein in large quantities, Sood reported. On comparing with natural beta-casein gene, the scientists found the artificial gene to be similar in structure. The team has filed a patent for the technique.

Unlike mother's milk, one litre of which produces only a few milligrams (mg) of beta-casein, the new method helps produce as much as 28 mg of pure beta-casein from one litre of *E.coli* cells. In nature, it is extremely difficult to produce one litre of mother's milk. Sood said this method might revolutionize production of infant formula foods.

{PTI Science Service, 18(2), 1999,9}

STORAGE AND INFESTATION CONTROL

108 New fumigant to increase shelf life of potatoes

Potatoes will now have a longer shelf life, thanks to liquid fumigant Oorja-a sprout suppressant that forms a protective layer around potatoes before being kept in cold storage. The product protects the potatoes from shrinking and sprouting while in cold storage besides increasing the sweetness of the commodity.

Another feature of the product is the low consumption of power needed for cold storage as lower cold temperatures are effective to prolong

the shelf life. Potatoes can be stored at 10-12 degrees when Oorja is used as against the two degrees at present. According to United Phosphorous Ltd, the company which has introduced the project in India for the first time it is highly safe in application and poses no danger in consumption of potatoes after application.

The product is in liquid form and the dosage required to be fogged will be 30-40 ml per metric tonne of potatoes. The product to be launched nationally will be sourced from UK. It is being manufactured at UPL's plant in Britain. Oorja is already being marketed internationally by UPL since last 12 years and is used by food giants such as McDonalds worldwide.

{The Financial Express, 15 March 1999, 16}

109 Preservation of tamarind

The chemical constituents of the fresh tamarind varieties were 20.15 to 24.50 per cent moisture, 18 to 48° brix TSS, 65 to 77 per cent total solids, 15.84 to 20.16 per cent tartaric acid and 0.68 to 2.00 per cent ascorbic acid. Each tamarind variety was treated with (a) salt – 10.0 per cent (b) salt – 10.0 per cent and KMS – 0.5 per cent (c) KMS – 0.5 per cent and packed in polythene bags of 300 gauge thickness (2.0 kg cap) and stored at room temperature with a control of 12 months. Similarly each variety of tamarind was packed in polybag without any treatment and stored in the cold room at 10° C for 12 months. Results showed that the samples kept

at 10° C had retained their original physiochemical characteristics. The samples (a,b and c) stored at room temperature retained their colour upto five months. Further storage showed a drastic change in their colour (black) whereas the control sample lost its original colour within two months of storage. None of the treated samples showed insect infestation whereas the control sample was affected by *Pachymeres gonagra* after eight months. The samples kept in the room temperature exhibited an increase in the moisture content and a slight reduction in total solids, TSS, acidity and ascorbic acid contents irrespective of their treatments.

(*Spice India*, 11(10), 1998, 9)

110 Cold carrots fight frost

Scientists at a British university have discovered a natural antifreeze in carrots that protects the plant against frost. This idea can be used in other crops for the same reason, to protect human organs for transplant and to preserve food in freezers. Carrots only make their antifreeze when they are growing in cold soil. Those grown in greenhouses make none.

Natural antifreezes like this one do not work like the man-made liquid put in car radiators. Dr. Maggie Smallwood, head of the team from the York University, northern England discovered the carrot antifreeze. She says: "They work by binding to ice crystal surfaces and thus stopping the crystals growing. A lot of the damage

is caused when the ice crystals grow, get large and disrupt the tissue structure. A protein that stops crystals growing can reduce tissue damage." Dr Smallwood's team squeezed juice from carrots grown in cold conditions, and placed it in a refrigerator after adding ice crystals. Later, they studied it under the microscope to see if the crystals had grown and concluded they had not. But when they repeated the experiment with juice from those grown in a warm green-house, the crystals grew at the normal rate.

Clearly something in the juice from the cold carrots was acting as an antifreeze. Analysis revealed that a single protein, one of the complex chemicals that make up living things, was responsible. They found the gene-the blueprint of the carrot plant – for making the antifreeze protein. The next step was to see if the gene would work in another plant. They used gene techniques to transfer the gene into tobacco plants- not because they are planning to protect tobacco against frost but because a great deal is known about the genetics of tobacco plants.

Dr. Smallwood explained: "Extracts from the plant don't normally stop ice crystals growing. But extracts from plants with the added gene did not stop the growth." The gene will make the antifreeze in other plants. One long-term application for the technique will be to provide crops with in-built genetic resistance against frost damage. That

will involve genetic engineering to move the gene from carrots to cereals or other crops.

But simpler uses could come first. "For example, the quality of food that is stored degrades if it's left in the freezer for a long time, chiefly due to formation of ice crystals. Maybe you could use very simple natural extracts of carrot juice to control that." Such applications help to explain why a research team at Unilever, the giant frozen food company, is working in partnership with York University in this research. "The pure protein might be used to help protect against freezing for tissues and organs (for transplant) frozen and stored for medical purposes. Some such tissues are found damaged then they are thawed out, due to the formation of ice crystals."

The team is now searching for more natural antifreezes in other plants. Although five different ones have already been found in fish and other animals, and one or two have been transferred into plants, there is evidence that a natural plant antifreeze may work better for plants and plant products in general. The natural antifreezes seem to be more effective than the man-made variety. As biologists point out, this is not so surprising. Millions of years of evolution have been at work to perfect the natural product.

{Science Express, 9 March 1999, 8}

111 Food bio-protectant

A new natural bio-protectant product significantly extends the shelf-life and protects the flavour of fresh and processed foods. MicroGARD is manufactured by Rhodia and marketed by its subsidiary in New Zealand and has ANZEA acceptance. It is not a preservative in the traditional sense, but an ingredient that uses naturally produced microbial metabolites to protect food from deterioration. It allows food manufacturers to benefit from fermentation based defense mechanisms without necessarily having fermentation.

MicroGARD works together with all the other hurdles food manufacturers use to minimize the outgrowth of susceptible organisms. MicroGARD is also ideal for those firms who are looking to retain or grow natural product identities.

Contact: Rhodia New Zealand,
Karl Crawford.

{Food Technology, 34(1), 1999, 8}

FOOD ADDITIVES

112 Vanilla flavour

The French firm Prova, a major European importer/ transformer of vanilla pods (chiefly the Bourbon variety), supplies an individualised product, matching aroma specifications to each customer's requirements. The company holds

substantial market share in chocolate and biscuit vanilla flavourings, and has two innovative product ranges for this market. It has a full range of natural vanilla extracts in powder, liquid and solid form, offering special technical properties (instant solubility and high aromatic yield) for significantly improving the quality of cocoa mass, biscuit dough and cream fillings.

The Provonil range is a subtle blend of natural and synthetic flavourings, which provide an attractive alternative to synthetic products such as vanillin. Provanil flavouring agents are produced by encapsulating Nature Identical synthetic molecules in natural vanilla extract. This produces an optimised trade-off between the necessary strength and the rounded vanilla aroma when incorporated in cocoa mass, dough or cream fillings. Prova has now diversified into other extracts and essences, namely cocoa and a variety of well-balanced coffee flavours (Robusta, Arabica and Colombian). These are very concentrated so that the user needs only a little powder and liquid and therefore avoids any duty taste.

Company specialists offer an individualised custom service to match aroma specifications to individual requirements. Prova's experience and know-how is backed by attentive customer service, flexible production resources and competitive market performance in the 25 countries where the company is present.

Contact: Terri Lipanovic,
Salkat, New Zealand.

(Food Technology in New Zealand, 33(11), 1998, 26)

113 Microencapsulated flavours

Two encapsulation techniques have been developed to protect the ingredients from the risk of development of 'taints' and to preserve aroma and flavour for extended shelf life. The encapsulation techniques control the release of flavours, artificial sweeteners, gases, minerals, vitamins, acids, and lipids during processing or eating.

Microencapsulated essential oils and price oleoresins have been developed using these techniques. The former has been developed based on spray drying process in which micronised oils globules are coated with hydrocolloids and dried. In another process, the flavours are retained in hydrocolloids by forming complexes. Microencapsulated flavours enhance the keeping qualities and acceptability of instant foods.
(Technology Focus, 6(2), 1998, 6)

114 Innovative mustard flavour

Palos Verdes International (PVI) is a private company set up by Peter and Barbara Ferguson to extract volatile flavours from grains, seeds and other foods.

The first product from the company is a natural mustard flavour, Volatile Oil Mustard, steam distilled

from mustard seed and mustard meal. The technology used ensures that the volatile flavour is not affected by heat or subject to oxidation. Other by-products include vegetable oil from the seed or meal and the de-flavoured meal. The latter is about 40% protein and can be used as a high-grade animal feed.

The only raw materials are mustard seed and water. CSIRO and the Yandilla Mustard Company developed the Australian seed some years ago. It is unique because it contains no erucic acid. The seed is cold pressed and filtered and the oil is sold as a high quality alternative to other cooking oils. The meal that is left still contains some oil, all the protein and the hot mustard flavour.

PVI product is Australian, made from natural Australian seed using Australian developed technology. The flavour is not modified in any way by the extracting process and it contains all the minor flavours not available in synthetic flavour. Some Canadian seed, Forge Variety, Oriental Mustard Seed Quality Number 1 may also be used when there is insufficient Australian mustard seed to meet the demand.
(*Food Australia*, 51(1/2), 1999, 47)

115 Crumb coatings full of flavour

Belso Cereals Research & Development has developed an alternative to traditional breadcrumb

coatings for the UK's £ 577M coatings market.

The company claims its bespoke process gives products with a highly resilient structure, and flavours and spices can be bound inside the crumb. Thus coating is said to be an effective flavour carrier, and when flashfried, offers a superb non-greasy finger food. As with its sweet crumble products which are used in the 'twin pot' yogurt market, these coatings are distributed by Billington's.

(*Food Manufacture*, February 1999, 14)

116 'Keep fresh' salt

'Keep fresh' salt has been developed to ward off rancidity and off-flavour in fried products like potato and banana chips, fried moong dal, etc. Rancidity and off-flavour develop due to atmospheric oxidation.

This salt is antioxygenic in nature and increases the shelf life of normal fried products from an average of about one month to four months. The salt remains free flavouring and does not lose antioxygenic activity even after six months of storage.

(*Technology Focus*, 6(2), 1998, 6)

117 New fruit fillings, toppings and preparations

24 delicious flavors including bramley apple, blackcurrent, cherry, raspberry, forest fruits have been introduced by Fourayes. These flavours are excellent for preparation

of pies, danish, lattice, turnovers, crumbles, doughnuts, pancakes, cheesecakes and gateaux. Products can be developed to meet customer specific requirements and budgets. Superb fruit identity and flavour, bake stable and freeze thaw stable products are ensured.

For further information contact: Fourayes farm limited, Bicknor, Sittingbourne, Kent ME9 8BJ, E-mail: sales@fourayes.com ; www.fourayes.com.

(Food Manufacture, February 1999, 9)

118 Vitamin E, antioxidants prevent brain cell death

Laboratory tests have shown vitamin E prevents the death of brain cells exposed to a toxic protein found in the brains of patients with Alzheimer's disease, according to a researcher at the University of Kentucky. The protein – amyloid beta peptide (AB)- is the major constituent of the senile plaques found in Alzheimer brains. AB generates oxygen free radicals that attack and kill brain cells, according to Allan Butterfield, Professor of Chemistry and Director of the Centre for Membrane Sciences of the University of Kentucky. He described his report at the national meeting of the American Chemical Society held during August. In his research, Butterfield added AB to the normal brain cells of test rodents and watched as all the cells died. He then pretreated rodent brain cells with Vitamin E before adding AB. The

vitamin E prevented oxidation and cell death in almost every case, he said.

Another study, done in collaboration with colleague Mark Mattson, achieved even more dramatic results. In this experiment, Butterfield added AB to brain cells that had been genetically altered to produce antioxidants. All of the genetically altered cells survived. "The tests provide a model for how Alzheimer brain cells die-one I hope might someday light a path toward better therapies," he said. In 1994, Butterfield first postulated that AB generates oxygen free radicals that kill cells. His work has helped to promote further research to determine whether antioxidants, such as vitamin E, could keep the cells alive.

(INFORM, 9(11), 1998, 1076)

119 Corn-based low-calorie sweetener

A natural dietetic sweetener, extracted from genetically modified corn, is currently being developed by Nektar Worldwide, College Station, Texas. The sweetener is based on the West African plant protein Brazzein, which is said to be 2,000 times sweeter than sucrose. "We expect to extract one kilogram of Brazzein from a ton of corn processed," said Jim Eckles, president and chief executive office. "This doesn't sound like much until you realize that this equates to at least 1,000 kilograms of sugar." According to Eckles, the technology could produce a new high fructose

corn syrup with twice the sweetness without adding calories.

The Brazzein protein was first isolated and its gene synthesized at the University of Wisconsin. It is highly stable, has sensory qualities that allow it to replace other products currently in the market, and is natural, which may be attractive to consumers. NeKtar Worldwide has the exclusive rights for its use as an extracted sweetener. The company will explore several production options in plants as well as fermentation. *{Food Technology, 53(1), 1999, 86}*

PROCESSES

120 Winemaking technology breakthrough

New winemaking technology developed by an Adelaide company gives better control of the winemaking process. The first of the systems has been installed by South Australian automation and electrical engineering company, CAAMS, at the new \$18 million Stonehaven Winery at Padthaway by BRL Hardy Limited. The technology was installed in time for the 1998 harvest after an eight-month design, installation and commissioning schedule.

CAAMS' Managing Director, Barry Keats, said there had been considerable additional wine industry interest in the system. "The system is state-of-the-art and monitors the production of wine from point of

receival of the grapes through to bottling," he said. The integrated system is able to commence work at the winery's front gate, recording the arrival of grapes and other information including their origin, type and weight and the grower's details. The technology continues its integral involvement in the winemaking process through until bottling and includes monitoring of wastewater from the winemaking process.

The CAAMS instrumentation also includes 'intelligent' features allowing the winemaker to set alarm trip points. "Our aim is to work with, identify and implement the complete automation and electrical solution for clients," said Mr. Keats. CAAMS also won a national Institute of Engineers award for \$1 m automation project for National Dairies' Mile End control system upgrade.

{Food Australia, 51(1/2), 1999, 48}

121 Osmotic dehydration technique for banana

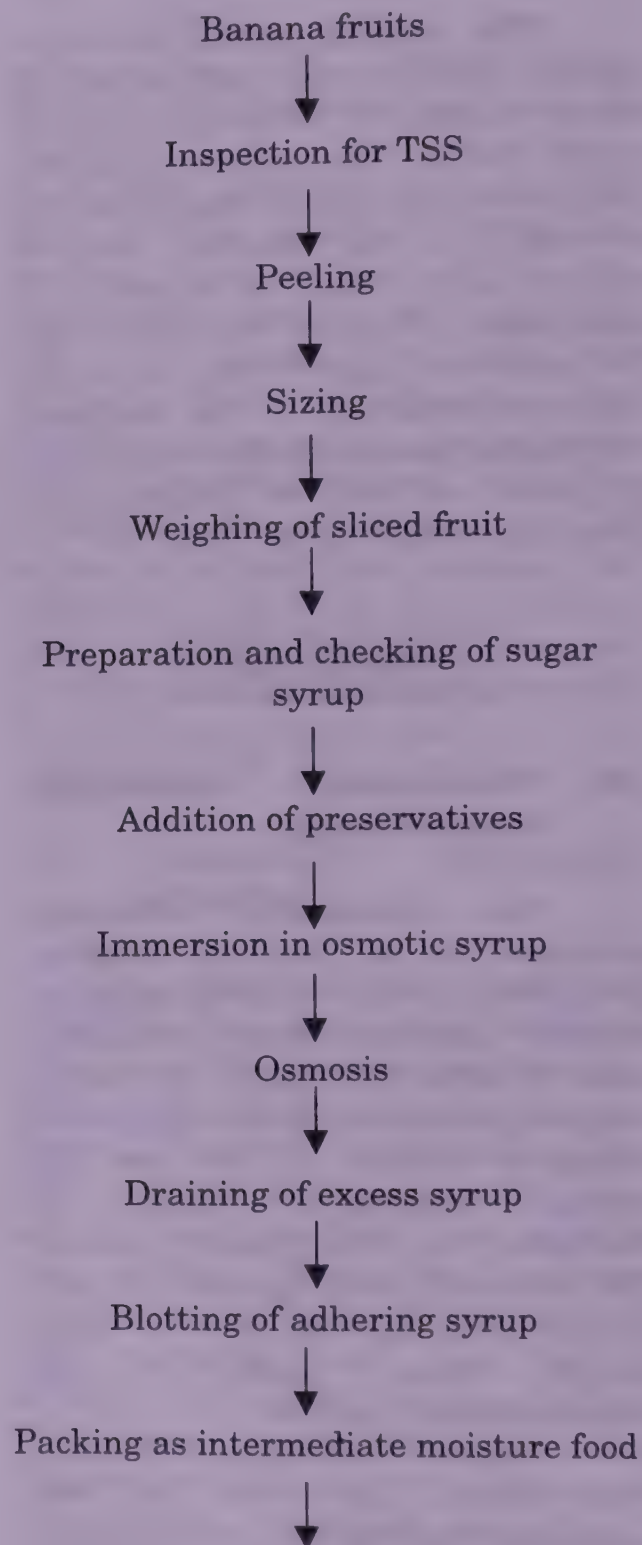
Dehydration is one of the easiest methods practiced for the preservation of banana, but the conventional methods resulted in discolouration and deterioration in quality of the product. A novel two-step osmotic dehydration technique has been developed by the Department of Agricultural Processing, College of Agricultural Engineering, Coimbatore, for the production of quality dehydrated banana slices. In this technique, the slices were first placed

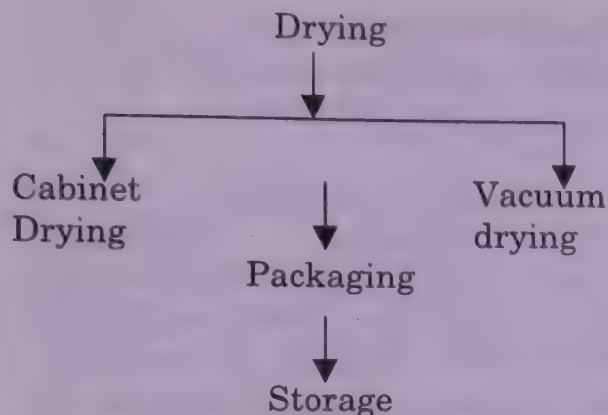
in a hypertonic solution of sugar, for partial dehydration through the semi permeable membrane structure of the fruits, then dried in a vacuum drier. The osmosed banana slices can also be consumed as 'Intermediate moisture food'.

Nedran banana known for its fruit value in Kerala and Tamil Nadu was cut into 5 mm thick slices (chips) and soaked in 60° B sugar syrup. When the sugar syrup was maintained at 75 ° C, 50% of water was removed from the slices within one hour of osmosis time, and a maximum of 53.1% of water could be removed when it is soaked for 2.5 hours.

The dried banana slices under vacuum, yielded a superior quality product without shrinkage and brown ring formation because of the sugar coating on the osmosed slices. Osmo vac dried slices had the total and reducing sugars content of 57.78 and 32.18%, respectively, and ascorbic acid content of 2.78 mg/ 100 g. The novel technique also resulted in a better rehydrated banana slices with a rehydration ratio of 1.63. The osmo vac dried banana slices could be stored in polyethylene bags (350 gauge) for 30 days without any spoilage. The novel two-step osmotic dehydration technique could be utilized for the production of superior quality banana slices suitable for long term storage and export.

Osmotic dehydration process of banana – flow chart





{Invention Intelligence, 34(1), 1999,11}

122 Improved technology for fresh ginger processing

Ginger oil is prepared at commercial scale from sun-dried ginger. Sun drying of ginger rhizomes normally takes about 2-3 weeks and during this long period of drying, 25-30% of the volatile oil is lost. Low-boiling constituents of the oil which are the prime contributors of the characteristic fresh ginger flavour account for the major portion of this volatile oil loss. Ginger oil when extracted directly from fresh ginger not only gives a higher oil yield but also superior quality oil compared to that from sun-dried ginger. Also, fresh ginger processing avoids the long intermediate drying step.

Earlier attempts to extract oleoresin from fresh ginger were hampered due to technical problems of emulsion formation. The Regional Research Laboratory (RRL), Thiruvananthapuram, has recently developed a process which envisages extraction of ginger oil directly from fresh ginger. Ginger powder retains most of the pungency. Ginger starch

and ginger condensate are the byproducts of the process. Ginger powder can be utilized for oleoresin extraction, in pickling, in candies, etc. The juice condensate can be effectively used for making ginger flavoured soft drinks.

Higher yield and premium quality due to fresh flavour places the process at a better position as compared to dry ginger processing. The laboratory is also planning to develop processes for downstream products like fractionation of oleoresin for high-value products. The project is being implemented in Manipur at the initiative of Rishang Keishing Foundation for Management and Tribal Area (MATA) under the Chairmanship of former Chief Minister of Manipur, Shri Rishang Keishing. As part of the programme, five common varieties of fresh ginger produced in Manipur have been analyzed at RRL for their oil and quality. The values are comparable with those of Kerala varieties. The commercial and technical viability seems to be very high in Manipur since the geographical disadvantages lead to transportation bottlenecks and product spoilage. The technology of fresh ginger processing will help reduce the weight by 300 fold, increasing the potential for proper utilization of the byproduct, and thus enabling better product value. Besides, the uniqueness of the flavour characteristics will improve the demand.

It is intended to establish 10 tonnes/day processing plant on turnkey basis. The project is expected to become operational by mid 1999. The same plant can be used to process turmeric and chilli with some additional facilities taking into account the seasonality of the ginger harvest, thus further enhancing the process economics.

{CSIR news, 48(21), 1998, 324-325}

BY PRODUCTS AND WASTE UTILIZATION

123 Agriculture waste projects

Government has enhanced the outlay for energy recovery from urban and agricultural waste from Rs. 4 crore in 1998-99 to Rs. 12 crore in 1999-2000. This will give a boost to projects promoted through the national programme on energy recovery from urban, municipal and industrial wastes, and projects on development of high-rate biomethanation processes as a means of reducing green house gases emission. United Nations Development Programme and Global Environment Facility are assisting the latter project.

Initial estimates indicate that about 27 million tonnes of solid waste and about 4,400 million cubic meters of liquid waste is generated every year by urban and municipal sector in the country. Most of the waste generated in the country finds its way into rivers, ponds and land without

treatment emitting gases such as methane and carbon-dioxide resulting in air and water pollution.

Financial incentives to state nodal agencies, municipal corporations, financial institutions, project developers and technology providers for setting up waste-to-energy projects are being provided by the ministry of non-conventional energy sources under these programmes. Currently, the ministry offers investment subsidy upto 50 per cent of promoter's direct equity stake in the project limited to Rs 1 crore per mw for power generation and Rs 50 lakh per mw for waste-to-fuel projects. It also provides interest subsidy of 10 per cent on the loan amount limited to maximum capitalised amount of Rs 1 crore per mw.

{Business Standard, 5 March 1999, 2}

124 The development of disposable package from banana leaf

Banana leaf, once a staple of Thai life, makes a perfect food packaging material. Everything from rice noodles to desserts can be found lovingly wrapped in this natural material. Trays, cups or boxshaped containers can be prepared by cutting the leaf into the shapes and sizes needed, then folding the leaf up on each end and holding them in place with thin wooden pins. The leaf has been almost completely sub-planted by plastic because of its short shelf-life, unpleasant odour (dried leaves) and susceptibility to mould growth.

Though it has been realised that plastic waste poses serious problems to the environment, the waste continues to pile up. This is due to the fact that no proper alternatives have been proposed. All of these facts have led to the current research work in Thailand on the development of disposal food package from banana leaf.

Leaves of five varieties of banana trees that are widely planted in Thailand were selected for study of some packaging properties. The varieties included *Musa balbisiana* 'Tani Dam', *Musa* (ABB group) 'Kluai Nam Wa', *Musa* (AAA group) 'Gros Michel', *Musa* (AAA group) 'Cavendish subgroup' and *Musa* (AA group) 'Kluai Khai'. It has been found that each variety represents differently outstanding properties. 'Cavendish' leaf possesses very good tensile strength, about 7 kgf. 'Tani Dam' and 'Kluai Nam Wa' have high tear resistance, ranging 165 to 188 mN and 'Kluai Nam Wa' is also good in folding endurance, average 25 times. It has been shown that the leaves have to be dried before the forming process and the suitable moisture content should be 10 to 12% due to their flexibility, strength, and stability to mould growth during storage. Banana leaf packages were formed into shape by the thermal compression moulding method. The factors affecting the packages' strength and dimensional stability are compression pressure, temperature, time and the number of leaves. The optimum forming conditions were 2-5 tonnes of pressure

at 70-100° C for 30-90 seconds. The number of leaves varies from 3 to 7 or more depending on the strength required and the applications.

The packages have shown the following properties and uses: they are suitable for one usage and should not be cleaned for further use; are easily biodegraded under soil; after 7 days under normal soil, the packages deform, delaminate and disintegrate into places; are suitable for both hot and cold foods. Moreover, liquid or high fat content food can be served in these packages; can be stored for about 6 months in sealed plastic bags under ambient condition; can resist grease and oil penetration for about 40 hours and water for more than 24 hours.

(*Indian Food Packer*, 52(6), 1998, 62-65)

125 The development of package from cassava starch

Cassava is one of the economically important crops in Thailand and the cheapest raw material for starch production. Both flexible film and rigid expanded package have been developed from cassava starch.

Cassava starch must be firstly dispersed into solution of water, then casted into thin film. Plasticizers are added to improve film flexibility. The starch solution is prepared from the following materials: 5% (based on starch weight) of plasticizers and

water. The mixture is then warmed to about 80° C to gelatinize the solution. Film is formed with equipment similar to that used for thin layer chromatography. The applicator enables a controlled thickness of the solution to be deposited on a smooth glass plate covered with polyethylene film. The plate is then placed in a chamber at 60° C to dry out water from the film. Film plasticized with 30% sorbitol possesses very good packaging properties, compared to other plasticizers, polyethylene glycol and glycerol.

The film has shown the following properties: It is transparent and has smooth surface; soluble in water; heat sealable at 160° C with seal strength 19 N/25 mm; thickness – 40 to 60 microns; elongation at break – 10-13%; tensile strength – 1.77 kg; folding endurance of 45 times; oxygen transmission rate (OTR) – 6 ml.mm/m²; water vapour permeability (WVP) – 0.37 g/ m².mm Hg.24hr, at 27° C, 65% RH; excellent grease and oil resistance, more than 120 days.

According to the outstanding properties of oxygen barrier, grease and oil resistance and heat sealability, the film is very suitable for fatty food packaging either as wrapping film or sealed bag. The film will provide an important means to reduce the rate of fat oxidation and subsequently extend product shelf-life. Because the film is edible, it is not necessary to unwrap the product prior to consumption. This is a significant advantage for instant products, for example, instant

noodles, drink and soup. The results of this research have shown that oily seasoning or chilli paste for instant noodles "Tom Yam" can be stored in the edible bag for more than 5 months at 35 to 55° C. The bag is easily dissolved within one minute into water while cooking the noodles. Because all the paste can come out, nothing is wasted. This can reduce the paste weight by 20% in each bag.

Basic starch formulation contains about 90% (dry basis) of native cassava starch and some percentage of plasticizers. In some particular formulations, emulsifier, calcium carbonate and agar are added to improve specific properties of the finished product. The starch mix can be prepared either in dough or in viscous form, depending on the expansion volume required.

Thermal compression moulding generally used in conventional thermosetting plastic industries is used for making expanded starch package. Weighed starch mix is placed in moulds previously heated at 200 to 240° C. Starch cooking takes place in closed moulds for about 1 to 3 minutes depending on starch formulation and product size. While leaving the moulds, the formed package contains about 2 to 3% of water or a_w of 0.11 to 0.12. Bulk density of the expanded product is in the range of 0.150 to 0.176 g/cm³ or about 4 to 5 times denser than styrofoam.

The cassava starch-based expanded package has shown the following properties: Bulk density – 0.150 to 0.176 g/cm³; moisture content – 2 to 3% and a_w – 0.11 to 0.12; equilibrium moisture content of 11.45% at 30 ° C, 65% RH; tensile impact energy – 0.01 to 0.02 joule; water resistance about 75 minutes depending on the starch formulation and thickness of package; grease and oil resistance for several hours.

The expanded package from cassava starch has been found very practical in fast food services and one way uses for ready-to-serve meal. It can be used for dried through humid products for a few hours. According to hydrophilic property of starch, the utilization of this package is still limited for hot-liquid food or drink such as soup, curry, tea and coffee. The development of hydrophobic coating materials is currently under investigation.

{Indian Food Packer, 52(6), 1998, 62-65}

126 Protein from chilled chicken

The preference of the consumers in the live broilers in 99% cases results in about 0.3 million tonnes of poultry waste throughout the country. In Delhi and Mumbai, 30 truckloads of poultry refuse is wasted everyday – in Mumbai it is thrown into the sea and in Delhi on the open land which cause severe environmental hazards. The wastes are rich source of organic manure. In

the opinion of Mr. Sanjeev Sable, General Manager of the Nasik based C & M group, these wastes can be effectively utilized by setting up dehydration units, chilling and processing units and centralised refuse disposal facilities which will save at least 30% of the protein waste. *{Farmer and Parliament, February 1999, 4}*

127 Recycling process water

Large volumes of spent process water containing polluting product and chemical residues are today discharged by the food industry with damaging effect to the environment. The constantly increasing effluent charges have now moved the focus from end-of-pipe-treatment to prevention of pollution. The term “process water” covers a wide range of by-streams such as : Spent CIP solutions, product/ water mixtures (white water), RO/UF permeate, evaporator condensate, flush/rinse water etc. In food processing, the pollutants in the waste streams are often product residues, which in a concentrated form can prove to be a valuable resource.

The philosophy of APV is to offer environmentally sustainable systems for separation and re-use of the valuable components in the process water streams such as: clean water, product residues, chemicals and heat. Industries for which these systems can be particularly valuable include: dairy, beverage and brewing, vegetable processing, fish processing,

slaughter houses and other food related industries with high levels of water consumption. By use of membrane filtration a process water stream can be separated into two streams: the retentate (concentrate) containing the recovered product residues; and the permeate consisting of purified, reusable water.

Membrane filtration is a purely mechanical separation process with absolutely no addition of chemicals to the product. Typical volumetric concentration factors are 10-20, meaning that the permeate will account for 90-95% of the feed volume and the remaining 5-10% is the product concentrate. Depending on the process water stream to be processed and the desired use of permeate and retentate, one of the following four membrane filtration processes is applied: reverse osmosis, nanofiltration, ultrafiltration, microfiltration.

The food industry is increasingly demanding processing equipment to solve environment related problems. Membrane filtration offers a number of possibilities, and a rapidly growing number of APV Membrane Filtration plants are being installed to provide economical and environmentally sound solutions.

(Food and Drink, October 1998, 17)

PROCESSED PRODUCTS

128 Apple snack

Snack Apple, fresh sliced apples with an edible coating of natural plant extracts, was developed for Léo de Groot, Managing Director of Westernport Orchards at Tyabb, Victoria by Dr. Vic Reyes of Food Science Australia. Mr. De Groot wanted to market a fresh apple snack product which would allow a refrigerated shelf life of 14 days, with no added preservatives. The preservation system used to produce this new apple snack is based on edible coating, natural antioxidants and modified atmosphere packaging. In combination, this system will inhibit browning in refrigerated apple slices and prevent the need for preservatives.

"We have developed a range of edible coatings made from natural vegetable extracts that keep fruit pieces fresh, clean and wholesome. In some cases, the effect lasts up to 21 days," said Dr. Reyes. "Coatings not only extend shelf life, but they also improve product mechanical handling properties, help maintain structural integrity, retain volatile flavour components, enhance surface gloss and reduce enzymatic browning. These coatings form a clear glossy film that act like the skin of the fruit. They allow oxygen through to keep it alive and healthy, and they carry natural antioxidants that heal the wound you make when you cut a piece of fruit.

This prevents it going brown and seals in the vitamins, minerals and fibre," he said.

The edible coating can also carry new flavours to make fruit even more interesting than before. In the case of *Snack Apple*, the apple slices are dipped in natural fruit juice before being sealed in their protective coat. The new product was awarded Best New Retail Product at the Fine Food '98 Exhibition held in Melbourne in September.

Dr. Reyes says that, while food scientists in America are working on similar ideas, Australia is first into the market with a consumer product. "In time we hope to extend the range to include citrus and tropical fruits and maybe even fruit salad," he said. The technology applied to *Snack Apple* was developed by Food Science Australia in a project supported by the Horticulture Research and Development Corporation and the Department of Natural Resources and Energy, Western Coolstores Pty Ltd. has secured rights to market the technology in Australia.

(Food Australia, 51(1/2), 1999, 48)

129 New premix range

Weston Food Ingredients is a new range of products which, according to its makers, is being warmly hailed by bakers and operators of small bakeries, lunch bars and cafeterias-as well as the major supermarket chains like Woolworths and Big Fresh. Aimed at making the

baker's life easier, the Weston Food Ingredients range comprises more than 35 pre-mixes and concentrates, described by Weston Milling as "particularly user friendly".

"With some of our sponge mixes, you just add egg and water, and with some of cake mixes you can add water only," says business manager Dean Campbell. The bonus of using a pre-mix or concentrate is that you don't have seven or eight bags of different product sitting around opened. This is particularly important to small bakeries that don't have the space. If they buy our product, all they have to do is pull the product out of the bag, add the water and mix for five minutes, to have a top quality cake ready for baking," he says.

The Western Food Ingredients range includes: fruit cake mix, multi cake mix, donut mix, brownie mix, chocolate sponge mix, scone mix, Lamington dips, cheesecake mix, delux sponge mix, choux pastry mix, patisserie custard mixes, baked custard mix, vanilla slice mix, muffin mix, and pie filling mix.

Mr.Campbell is convinced that the superior quality of his company's product is the main factor in its success. "As Weston Milling produces the flour that goes into the pre-mixes, we've got more control over the final quality of the product. This is one reason why this range has been so well received." Weston Milling also produces a complete range of bread

mixes, bread concentrates, improvers, grain mixes and cereal mixes.

{Food Technology in New Zealand, 34(1), 1999, 28}

130 Unique biscuit products

APV Baker has combined two technologies to give biscuit makers the ability to create a unique range of added-value products with semi-liquid centre fillings. This new system combines APV Baker's full width creamer for biscuits and the one-shot centre-filled depositor widely used in the confectionery industry. Sandwich biscuits with twin fillings, and open tartlets with 2-colour striped surfaces, are typical product possibilities. With divisions serving the Baked Products and Confectionery industries, APV Baker is the only company able to extend the product range biscuit makers can offer in this way.

A policy of continual investment in core technologies has enabled APV Baker to develop a depositing head which encapsulates the centre filling. This ensures that there is no moisture migration into the biscuit essential to guarantee normal shelf life. An outer cream or fondant can surround a jam, caramel, or soft cream centre. As well as adding flavour and value to sandwiched biscuits, a variety of open tartlets can feature different coloured fillings, deposited simultaneously, as part of their design.

There is the possibility of adding inclusions such as fruit or

nuts; the plant configuration allows space for additional head to add a third deposit, and provide even more product variety. The system uses APV Baker's full width creamer, one of its range of biscuit sandwiching systems. This unit takes the full output of an oven and sandwiches without need of expensive lane reduction equipment. Its relatively low linear speed is ideal for operation with a depositor. Changes to biscuit size and filling colour can be achieved quickly and simply to maximise product diversity; a clean-in-place system is an option. Although designed to be part of a fully automatic line, off-line operation is an alternative.

Full pilot facilities for development of customers' own biscuits and fillings are available in the APV Baker Food Process Centre at Peterborough. These development facilities allow customers to significantly reduce the time and cost of bringing innovative new products to market. The Centre houses laboratory and production facilities, plus experienced technologists and engineers, within a highly secure environment. Product development, process trials and training can be carried out without the inevitable disruption to production usually associated with these activities.

{Food and Drink, October 1998, 8}

131 Cookies – new variety

Branching out from its line of premium chocolates, Godiva Chocolatier, Inc, has introduced a new

line of cookie products primed for the holiday gift-giving season. The addition of Godiva Biscuits marks the first time the New York-based Godiva, best-known for its gold foil-covered gift boxes of gourmet chocolates and truffles, has offered cookies among its confections. Formally introduced in September, the cookies are being sold through Godiva boutiques, upscale department stores and some gourmet grocery shops.

Like its chocolates, the cookies are produced in Switzerland and imported for sale, "so they are manufactured and made in the true European style," said Kim Land, Director of marketing, innovation, at Godiva. "Most people are not familiar with European brands (of cookies) and are reluctant to try them," Ms Land said. "The Godiva brand kind of assures them they're going to get a rich and indulgent experience."

The line includes five varieties-Chocolate Crème Delicate, a hazelnut biscuit topped with chocolate crème and enrobed in milk chocolate; Hazel nut Belgique, a meringue biscuit sprinkled with hazelnut pieces and covered in dark chocolate; chocolate-dipped vanilla biscuit Pirouette; Raspberry Chocolate Premium, a chocolate biscuit topped with raspberry crème and capped with dark chocolate; and Godiva Signature, a biscuit stamped with a square of chocolate imprinted with the company's name and rider logo.

The cookies are sold in gift boxes, at \$20 for a 37-piece assortment, and tins of 52 cookies for \$32, as well as 3.5-oz boxes of the individual varieties for \$7.50. Godiva's only previous baked product is biscotti, which it markets along with a line of speciality coffees. But unlike the biscotti, which the company considers a "niche" product, the cookies are expected to generate much higher sales, Ms. Land said. "This is going to be a main business it's going to have broad-based customer demand," she said. "We did a lot of research before introducing, and customers indicated they wanted a super-premium cookie."

Stores offering Godiva chocolates also have been conducting independent samplings of the cookie products. Ms. Land declined to reveal what Godiva is projecting in terms of sales, but said "it's meant to be a product line with great longevity, one that will probably build in terms of variety over time." Godiva is a wholly owned subsidiary of Campbell Soup Co., which also owns cookie and baked foods producer Pepperidge Farm Inc. *(Milling and Baking News, October 27, 1998, 18)*

132 Mushroom biscuits

The Hyderabad based Suji Foods India, engaged in processing and marketing of wet and dry mushrooms and their by products, has launched mushroom biscuits, which it claims is the first of its kind in the country. It has come out with five

kinds of Suji biscuits – Mush Super, Mush Marie, Mush-choco Malt, Mush Munchi Masala and Mush Kracker. Mush Marie is promoted as a balanced diet for diabetics with medicinal value- especially for those suffering from insulin related problems. Mush Munchi masala has a mixture of garlic, ginger, salt and chilli, in addition to mushrooms. Mush-choco-Malt is positioned as a food supplement for children and the aged.

Enquiries may be made to: Suji Foods India Limited, 5th floor, Triveni Complex, Palace Heights Building, Abids, Hyderabad – 560 001.
{*Indian Food Industry*, 17(6), 1998, 371}

133 Biotea for better health

Bio-tea also known as 'Kargosak Tea' is a unique beverage obtained by fermenting black tea decoction using two beneficial microorganisms namely yeast (*Candida sp.* T strain) and bacterium (*Acetobacter sp.* T strain). During fermentation the tea decoction is first converted to a sweetish, slightly alcoholic flavoured drink with better mouthfeel and body than the existing, empty caloric soft drinks. During this process several essential amino acids, vitamins, proteins, carbohydrates, extra cellulose digestive enzymes, organic acids, growth promoters, organic molecules of nutritional and therapeutic value (phytochemicals) are expected to have been elaborated during the time of

fermentation by the help of inoculated culture.

It can be relished in chilled form and without milk. It tastes like apple cider with a unique fruity flavour and aroma. While it can be stored, the disadvantage is that if kept for too long, that is more than six days there would be production of acetic acid (vinegar like) resulting in a very sour taste. Bio Tea produces beneficial effect on the digestion, nervous system, blood pressure and increases the vital energy of a person. It stimulates perspiration and metabolic processes in the human body and plays a certain prophylactic role. It improves general health, vitality and sex life. Some workers have reported that alkaloids in Bio Tea contributes to cerebral vasodilatation and therefore it is one of the best drugs against mental fatigue, flu or cold induced fever. The mild stimulating action of constituents present in Bio Tea is effective as a respiratory stimulant without any increase in pulse rate or blood pressure. It is often prescribed for migraine headache.

Bio Tea also contains theophytin which is responsible for its bronchodilatory action and provides some relief to asthmatics. Regular use of Bio Tea claims to protect against cancer, heart diseases, diabetes, degeneration of immune system, skin diseases etc. Hence this drink (advised to be consumed not more than 60 ml per day for beneficial effects) has the potential to be

commercially produced as an "Anti-aging" drink to make it available for all and people everywhere.

Some of these above mentioned benefits claimed by Bio Tea are now under investigation at the University of Agricultural Sciences (UAS), Bangalore by a team led by Dr. M.P.Vaidehi in the Food Technology Lab. The parameters studied on preventive and controlling measures for diabetes, blood pressure and overall health and vigour in elderly subjects are positive and beneficial, while in normal subjects weight maintainance and exhilarating effects are being observed.

(Deccan Herald, 2 March 1999, 15)

134 Japanese firms offer Specialty health foods

In Japan, new Specialty health foods recognized to have specific functionality for human health by the Ministry of Health and Welfare, have been developed. Nisshin Foods Co. has begun selling instant noodles containing "psyllium", natural dietary fibre, which has the functionality of intestinal scavenger. Taishi Foods Co. is selling tofu containing casein phosphopeptide, which is said to aid absorption of calcium. Fujikko Co. has been selling "nata de coco fibre" containing digestible dextrin as dietary fibre.

Specialty health foods were introduced in Japan in 1991 and more than one hundred products have been officially approved. Market size of the

specialty foods in Japan is said to be more than ¥20 billion.

(INFORM, 9(11), 1998,1071)

135 Phytoestrogens in cereal food

Specialty Cereals Ltd have launched two breakfast cereals under the *Vogel's* brand, to provide naturally occurring phytoestrogens in a breakfast cereal product. Until now *Vogel's* brand has been associated with bread. *Vogel's* whole grain breads have maintained a market prominence for almost 45 years. This wholly owned Australian company believed that there was a nutritional gap in the cereals market, hence launched two revolutionary cereal products.

Soy & Linseed Cereal and *Soy-Tana* are the cereal products that *Vogel's* believes will make the same or even greater impact than *Vogel's* bread, on how we perceive and eat breakfast cereals. They have been formulated by nutritionists to contain ingredients that have functional food benefits, namely soy and linseed. The potential health benefit of soy and linseed is receiving significant attention in the scientific literature. Dr. Fabien Dalais, a Post Doctoral Fellow at the Department of Medicine, Monash University who is involved in research into nutrition, phytochemicals and functional foods, has been appointed as spokesperson for *Vogel's* Cereals. His extensive research and findings concerning phytoestrogens and nutrition in general, have played an integral part

in the development of *Soy & Linseed Cereal* and *Soy-Tana*.

Dr. Dalais conducted a clinical trial examining the effects of phytoestrogens found in soy and linseed on menopausal symptoms. The results from this study have led to a variety of food products high in soy and linseed, notably a range of breads and cereal products. Further research has illustrated a potential beneficial role of phytoestrogens in cancer and cardiovascular disease.

{Food Australia, 51(1/2), 1999, 48}

136 Transgenic sugarbeet that contains low-calorie sugar

Those with a sweet tooth, but a mind for their waistline, have cause for celebration as by using a neat trick of genetic engineering, scientists have converted sugarbeet from a source of high calorie sucrose to that of low calorie fructans. Scientists at Centre for Plant Breeding and Reproduction Research in the Netherlands have developed this transgenic sugarbeet which can be used in food products as well as in industry.

Fructans are polymers of fructose that accumulate in approximately 15 per cent of the flowering plant species as a reserve carbohydrate. They are currently being used in several food products and hold promise as a feedstock for industrial applications. In addition, beneficial bacterial species in the human intestinal track thrive on soluble oligosaccharides like fructans,

and their proliferation has positive systemic effects on the human body. Longer chain fructans form emulsions that are of interest to the food ingredient industry because of their fat like texture and natural taste. Such emulsions can be used as low-calorie fat replacers in specific foodstuffs like creams and spreads.

Sugarbeet which produce ten tons of sucrose per hectare annually, are one of the most productive crops in the world. Considering the high productivity of sugarbeet, the conversion of sucrose into fructans might become a low-cost process, providing an alternative to industrial production based on *Aspergillus* enzyme. Fructans are made from sucrose on a commercial scale in bioreactors using a process that is relatively expensive.

In Western Europe, fructans are commercially extracted from chicory roots, whereas in many other countries, Jerusalem artichoke tubers are used. Neither of these crops is an ideal fructan source because of the poor yield, difficulty in harvesting, complexity of post-harvest processing and low product quality. The new process involves the expression of a Jerusalem artichoke gene that encodes 1-sucrosesucrose fructosyl transferase (1-ISST) in sugar beet plants that enables the conversion of sucrose, which is normally present abundantly in beet vacuoles, into simple fructan sugar.

{PTI Science Service, 18(2), 1999, 11-12}

137 Italian inspired bread snacks

Land Food Products, a member of the Ivory Food Group, has launched two frozen products. Giovanni Party Snacks is an Italian inspired range. One pack comprises Foccacia bread slices topped with garlic and Italian herb, and Ciabatta bread slices topped with sun-dried tomato. The second has slices topped with garlic and parsley and onion bread topped with cheese, garlic and Italian herb.

{Food Manufacture, February 1999, 49}

138 Croissants as a sweet snack

French-made chocolate or cream patisserie croissants are now available from Delice de France. The thaw-and-serve croissants are available in two varieties: chocolate-topped with chocolate chips and cream-filled croissant with crunchy sweet-crumb. They weigh 60g each and can be warmed in 2-3 min on 180° C.

{Food Manufacture, February 1999, 49}

139 Meat-like vegetarian snack

Cheatin' Bites are the latest brainwave from veggie food specialist, The Redwood Company. The new meat-like pieces are available in Barbecue, Five Spice, Tikka and Chicken styles. The company claims they have all the flavour, texture and appearance of meat but clarify that

they are totally free from any animal ingredients, making them suitable for both vegetarians and vegans. Redwood also claims the Bites, which are made from a blend of soya and wheat protein, are also free from lactose and cholesterol.

{Food Manufacture, February 1999, 49}

140 Natural fruit juice range

New company, Pago Fruit Juice UK is debating with a range of fruit juices. Pago Fruit Juice is offering eight varieties of pure fruit juices in 200ml size and the company claims the products contain 100% fruit juice with fruit particles. The range includes apple, orange and the more bizzare combination of orange-carrot-lemon.

{Food Manufacture, February 1999, 49}

EQUIPMENT AND MACHINERY

141 Booming business for flavours

Dragoco, a world leader in powder flavours, has chosen APV Nordic, Anhydro as supplier for a new spray dryer, equipped with all the latest features in powder technology. The plant is built in the special SBD (Spray Bed Dryer) design, which allows the production of dustless and agglomerated powders. Extensive test work in the Anhydro test centre in Soborg was done in the conceptual

phase of the project. The convincing test results led Dragoco to place the order with APV Nordic, Anhydro.

The new plant will enable Dragoco not only to improve the quality of their existing products, but also to provide possibilities for the development of new unique powders and further strengthen its position in the world market for flavour powders. Based on the test results the design of the dryer was fine-tuned to the needs of the customer, so that an optimal performance is guaranteed. In addition to the sophisticated dryer the process includes UHT heat treatment and homogenisation of the feed product.

The Spray Bed Dryer is flexible and equipped with exchangeable centrifugal and nozzle atomiser, integrated fluid bed and a special patented Anhydro zig zag powder classifier. The powder separation system is specially designed for minimal product loss and a special treatment of the spent drying air ensures a low level of odour emission. The dryer is equipped with fully automatic CIP system facilitating the possibility of frequent changes of products.

The project is an example of teamwork within the Siebe group. The advanced control system will be supplied by Foxboro; the UHT system by APV Nordic, Unit Systems and different components will be supplied by other APV and Siebe companies. An exceptional part of the project was

the manufacturing of the drying chamber in one piece in Denmark and a combined ship and truck transport to the site in the heart of Germany. It was not easy to find a route for the truck with a load more than 6 meters wide and 12 metres long.

{Food and Drink, October 1998, 18}

142 Mini rotary ovens

The cheaper alternative to the rack oven is available in a mini size of 56" or 74" width, in gas or electric and using locally available components from Hohnson Controls and Honeywell. The Rotary oven ensures even baking across all products. The Picard ovens are ideal for breads, cakes, cookies and are available with stone shelves for flat breads. The ovens can heat to 400° E. Steam injection and an add-on Proover with its own air conditioning plant are both options and are delivered as a flat pack or fully assembled, and do not require a plinth.

{Food Technology in New Zealand, 33(11), 1998,32}

143 Hydro-pneumatic mix machine

The Melbourne Hydro-Pneumatic Shear Mixer is a liquid or pneumatic actuated device for mixing liquids and powders into liquids. Typical applications are where diatomaceous earth, flocculants, activated carbons, lime and yeast are used in the food and beverage manufacturing process. The unit also has the ability to achieve very high

vacuums – upto – 100 Kpa using water at 700 Kpa and can be used as a dry vacuum system as well as a vacuum generator.

The design of this device means the mixing process is totally enclosed from start to finish, providing a healthy, safe, quiet and efficient method of mixing liquids into liquids and liquids into powder. When the manufacturer inspected several industrial sites, which included food and agricultural industries, he found a number of unsafe work practices. Substances were being mixed using the bucket brigade method. That is the tipping of powder or liquid from one container to another – filling the worker's breathing space with clouds of dust or fumes. There are numerous chemicals in the workplace that are carcinogenic or respiratory irritants, skin irritants, eye irritants, corrosive or toxic, and many workers are unaware of the safety risk of the products they are using.

This mixer has a relatively simple operation. Fluid under pressure is diverted externally through pipes to two tangential ports. Fluid is fed into the main manifold where it exits into the mixer's main chamber via a ring of holes drilled at compound angles to the bore at the primary mixing port. This forms a clockwise vortex. At the same time, fluid under pressure is fed into a manifold where it exits into the mixer's main chamber via a ring of holes drilled at different compound angles. This forms an anti-clockwise

vortex. The forward velocity of the clockwise spinning liquid in the mixing section is less than the forward velocity of the product. All the product and liquid is sucked through this spinning liquid and into the second nozzle which is spinning the liquid anti-clockwise resulting in high hydraulic shear where the two vortex meet.

{Food Technology in New Zealand, 33(11), 1998, 22}

144 Solutions for heating in edible oil processing

A non-toxic and efficient process heat system, has been devised by GEKA – Energy Systems GmbH, Germany. It manufactures boiler for hermetically closed steam systems up to 95 bar (1350 psi), 3025 kW (12×10^6 BTU/H) for edible oil industry process heating.

{INFORM, 9(11), 1998, 1066}

145 Innovative turbidity measurement

Sigrist and John Morris Scientific have introduced the WTM500, an innovative turbidimeter that meets the stringent requirements of drinking water standards. Low maintenance with long-term stability, the WTM500 accurately measures a wide range of turbidities. It is designed specifically for turbidity measurement in drinking water in compliance with standard EN 27027/ISO 7027. Its measurement span covers 0 to 500 FNU in eight measuring ranges with a peak

resolution of 0.001 FNU, thus meeting all of the needs of drinking water treatment plants. Reliable and stable, the WTM500 has automatic calibration adjustment using a built-in solid reference. Window fouling is eliminated through non-contact measurement in free-falling water and there is no drift of the indication. SIREL, the WTM500's control unit, provides easy access for instrument operation, configuration and servicing.

For more information contact:
John Morris Scientific Pty Limited;
email: jms@enternet.com.au , web:
johnmorris.com.au.
{*Food Australia*, 51(1/2), 1999, 37}

146 Filler valve monitoring system

The INScan 100, provides quantitative fill volume inspection and analysis, as well as valve tracking capability for metal, glass, plastic, and paperboard containers. Major features of the system include actual fill volume tracking of each filler valve in mL, oz or g; rejection of underfilled, overfilled, and fallen containers; random or consecutive container sampling from filler and closing machines; high speed, 2,400 container/min inspection; and a filler-valve software interface for external plant computer networks.

For more information contact:
Thermedics Detection Inc, 220 Mill
Road, Chelmsford, MA.
{*Food Technology*, 53(1), 1999, 86}

147 Semi-automatic rotary gravity filling machines

Hunjan Machine Tools, New Delhi, manufactures semi-automatic rotary gravity filling machines. Applications are in filling glass, PET, LDPE, HDPE, PVC, flexible bottles, containers, and jars. Their approximate output is 20-25 bottles of 750 ml size per minute.

For further information contact: SPR Marketing Pvt Ltd, C-2/8 Phase II, Mayapuri Industrial Area, New Delhi 110 064.
{*Industrial Products Finder*, 27(4), 1999, 24}

148 Performer machine for shaping food

Perfectly formed products in a variety of shapes, with improved texture and quality and the highest yields ever, are now said to be possible with the new PerFormer^R from Koppens convenience food systems. This fully PLC-controlled unit features a patented Vario Seal Technology that minimizes leakage and waste. With its nominal capacity of 75 strokes per minute, the machine is a real workhorse performer for food processors.

All functions are operated from an exclusive easy-to-read graphic display. No mechanical adjustments are required. The built-in "product intelligence" ensures consistent high quality products even as production conditions change. By continuously

measuring the temperature of product in the press chamber, the Performer adjusts the pressure in the forming plate to produce a perfectly shaped and perfect weight product to meet specifications. Forming plates for the PerFormer are made of metal or plastic, and are available in a wide variety of shapes. Changing shapes is quick and easy: the twist-off design allows new plates to be fitted fast. With its hygienic design and leak-reducing forming system the PerFormer is easy to clean, too. All components are easily accessible for cleaning or service. The Koppens PerFormer meets or exceeds all CE, HACCP and USDA requirements.

For more information contact: Koppens at P.O Box 1, 5760 AA Bakel, the Netherlands.

{Quick Frozen Foods International, 40(3), 1999, 12}

149 Forming and portioning with formatic models

These forming machines have been supplied to the general food industry to form and portion products such as shortbread mixtures, biscuits and cookies, beef chicken and vegetable burgers, nuggets and falafels. The three Formatic models range in throughput from 1,200-4,000 drum rotations per hour. The depth of the drum can be easily adjusted from 3mm to 34 mm, ensuring the required weight is readily obtained.

{Food Technology in New Zealand, 33(11), 1998, 29}

150 Garbage disposer

Sree Devi Enterprises manufactures Waste King brand garbage disposer that can be attached to the kitchen sink. This is helpful not only in home kitchens, but also in hotels/ restaurants, etc. All food wastes like fish heads, bones, egg shells, vegetables, etc are ground into fine particles which are easily flushed through sewer pipes without any problem. The grinding chamber is made of glass filled nylon and glass filled polyester, eliminating corrosion. This has been approved by UL/ CSA, international quality approval institutions.

For further information contact: Sree Devi Enterprises, 'O' Block, 155 East Anna Nagar, Chennai 600 102.

{Industrial Products Finder, 27(4), 1999, 81}

PACKAGING

151 A coffee innovation

Moccona has entered the roast and ground coffee market with the launch of Moccone Arome, a new innovative technology that is exclusive to Douwe Egberts. The coffee is packed immediately after roasting, trapping freshness and aroma. A one-way valve in the seal permits the escape of natural gases without allowing oxygen to enter and deteriorate the coffee. Usually coffee

must be left to sit for some hours after roasting before it can be packaged.

The packaging is recloseable and eliminates the need to decant the coffee into an alternative container. This pack was awarded the SIAL d'Or award for Packaged Grocery. The award paid tribute to the innovative technology and design of the recloseable packaging.

{Food Australia, 51(1/2), 1999, 46}

152 Cashew export body launches modernised packaging

In an effort to improve quality of exports, the Cashew Export Promotion Council of India (CEPCI) has launched a modernisation programme, including a scheme to improve packaging. "Cashew kernel exporters are very keen on further improving the quality of exports and most of the processing units are close to attaining ISO and HACCP (hazard analysis and critical control points). We are extending help to update their technology," K.G. Nayar, chief executive and secretary, CEPCI said. Introduction of steaming of raw cashewnuts and electric morma (a device to remove cashewnut shell) and usage of flexible bag and carton instead of tin containers were the main ingredients of the modernisation programme. "There are over 1,000 raw cashewnut processing units in the country and so far only one unit in Kerala has attained the ISO and HACCP standard," he said.

Under the modernisation programme, one-third of the cost for the upgradation scheme was given as subsidy. While a maximum of Rs five lakh was given as loan for quality improvement, loans with ceiling limit of Rs 10 lakh were being allocated for modernisation and another 10 lakh was the limit for upgrading packaging facilities, he said. Loans were being extended by the Small Industries Development Bank of India. Of the 1,000 processing units in the country, 400 were in Kerala, 300 in Tamil Nadu, 100 in Karnataka and the rest in Andhra Pradesh, Orissa, Maharashtra and Goa, Nayar said. These units had now begun to use a system of steaming of raw cashewnuts before the shelling to replace the traditional system, he said. Again, an instrument to cut the cashew shell had been introduced to replace the traditional system of hammering the shells to get the kernel, he said.

{Business Standard, 16 March, 1999, 12}

153 Stretch N Shrink bag

Recently introduced to New Zealand following a successful record of use in Australia and Europe, the TNT "Stretch N Shrink" system was officially launched at Foodtech '98. Bob Price, TNT Pallone Logistics New Zealand manager said that the system will be available for rental or purchase. He believes that the Stretch N Shrink system not only gives a better presentation than other methods but also provides a low cost insurance against damage,

particularly when exporting valuable products. "Reliability is vital to ensure palletised goods are protected in transit from damage or theft. Poor packaging can cost companies enormous amounts of money and time, as well as their good reputation if products arrive poorly presented and or damaged," he said.

TNT's system completely covers palletised loads with a single layer of polythene film. It works by mechanically stretching a bag over the loaded pallet and then released. The bag then contracts and tightly grips the contents of the load just like a rubber glove. The resulting effect is that within minutes pallets are securely wrapped and ready to go anywhere in the world. "The TNT Stretch N Shrink system has proven to be extremely effective and will give users the confidence they need to ensure wherever their products go they arrive in showroom condition," Mr. Price said. He believes that many products are too valuable to take short cuts with cheap wrapping alternatives. On the other hand some companies go to extraordinary lengths by using more disposable packaging than necessary, which becomes even more expensive than it has to be. "The Stretch N Shrink system not only gives products protection from damage and wet weather conditions but also acts as a tamper evident seal. This is particularly important if you are exporting food related products," he said.

The film for the TNT system is applied cold which means there is no need to use dangerous outside heating sources to shrink the outside cover. Most food and pharmaceutical companies invest considerable resources to ensure their working environment is safe and hygienic as well as necessary precautions to protect products from contaminations. Spiral wraps can sometimes unwind making products more vulnerable to soiling in transit. Stretch N Shrink bag system enables the user to store the loaded pallets outside without concern about products becoming dirty or wet. Additionally the film can be recycled into other products which eliminates the need to dispose of waste materials into landfill.

"Whether prospective customers are wrapping cans of baby food, 200 litre drums or bricks, we will firstly encourage them to test the product by taking advantage of our free wrap trial offer," said Mr. Price. Part of TNT's offer is to wrap a standard pallet load of product free of charge and send it through normal distribution channels. This way prospective users are able to test first hand the results for themselves and compare them with past experience. *{Food Technology in New Zealand, 33(11), 1998, 36}*

154 **Biopreserved tender coconut water**

The process of preservation of tender coconut water using a bio-preservative has been standardised in

two convenient packaging systems, namely, 200 ml capacity polypropylene pouches and aluminium beverage cans achieving shelf life of three and six months, respectively. The above process enables retention of original flavour of coconut water over after six months storage, without any loss of nutrients.

{Technology Focus, 6(2), 1998, 6}

155 Cardboard makes a comeback

An environmentally benign alternative to plastic packaging has been developed by AssiDoman. Fibre Pac is made completely made from cellulose using residues of corrugated cardboard as a raw material base. AssiDoman claims the company has developed a rational moulding technique which produces high quality packaging with smooth surfaces, square edges and sharp angles. The company further highlighted the high degree of process flexibility allowing Fibre Pac to be tailored to meet individual customer needs; moulds can be changed in one working day and it is fully biodegradable.

{Food Manufacture, February 1998, 52}

156 Eco-friendly plastic bags

A method has been invented by S.K.Nanda for eco-friendly plastic production at the Central Tuber Crops Research Institute. He made the plastic by adding starch from tapioca to the plastic at the production stage using a soluble chemical agent. While

the ordinary plastic takes a century to degrade, this 'Nanda-plastic' takes only six months and they leave no poisonous elements in soil. In the near future, with the demand for banning non-degradable plastic all over the country, the cultivation of tapioca as well as commercial production of this plastic with existing units and workers will increase simultaneously.

{Farmer and Parliament, February 1999, 4}

157 Modular's self-adjusting cup dispensers

Simpli-Flex^R Cup Dispensers from Modular^R Dispensing Systems, a division of Tomlinson Industries, feature a flexible orifice that self-adjusts to dispense cups (extra small to jumbo sized) one cup at a time. The dispensers protect paper, plastic, and foam cups from moisture and contamination, says the company, and they can be mounted on walls or drink dispensers, or on Z-style or rotating countertop stands. (Built-in and countertop cabinet models are also available.) All units can be disassembled for cleaning and are dishwasher safe. To complement the cup dispenser, the company also manufactures fully adjustable Tubular Lid Dispensers, which allow multiple sizes to be stored in the same dispenser. Tomlinson Industries, 13700 Broadway Avenue, Cleveland, Ohio 44125-1992.

{Tea and Coffee Trade Journal, 171(1), 1999, 95}

ANALYSIS

158 Portable colour analyser

The colour-guide Sphere, combines sphere and LED technology in a hand-held instrument and may be used to take colour measurements anywhere it can be carried. It comes with a computer interface which allows direct transfer of color data to Windows applications, where it can be printed or further processed. The device is used by placing it on a sample and taking a reading.

For more information contact:
BYK-Gardner, 9104 Guilford Road,
Columbia, MD 21046-2759.
{*Food Technology*, 53(1), 1999, 87}

159 Texture analyser

The Leatherhead Food Research Association designed the Texture Analyser (TA) to quantify the textural properties of food products easily and accurately. Today the latest generation TA evaluates a wider range of food products than ever before. Portable and flexible in use, the texture analyser finds applications in R & D and quality control departments that are almost limitless. With just a few minutes of training, the staff can produce accurate, repeatable results. Simple experimentation with probe types combined with selectable speed and distance settings, enables operators to quickly establish test techniques that provide maximum information on any product. From over 30 years

experience of texture analysis, Neutrol has developed the widest range of probe fittings and accessories to suit any test material. An extensive library of applications and test results is also available.

For more information contact:
Neutrol Engineers & Company, 205-206 Aditya building No.7, Commercial Complex, Preet Vihar, New Delhi 110 092.

{*Industrial Products Finder*, 27(4), 1999, 15}

160 Solvent extraction system

The Soxflo™ has the ability to run three or six samples concurrently and is ideal for sample preparation for gas chromatography, mass spectrophotometry, or high-pressure liquid chromatography. The system requires no fume hood, water cooling, solvent heating or refluxing. It provides solvent extraction at ambient temperatures from a variety of materials such as foods, animal feeds, dairy products, oils, fats and pesticides.

For more information contact:
AnalytiChem Corp, 43482 Annapolis Rd, Ste 154, Bowie, MD 20715.
{*Food Technology*, 53(1), 1999, 87}

161 Water quality analyser

The HYDRA offers an easy, accurate way to get multiple water analysis results, including pH, temperature, total dissolved solids, conductivity and resistivity. The

unit's microprocessor automatically selects the proper range for the solution being measured, compensates for temperature, and displays a digital reading. A handy sampling tube and collection cup give the flexibility to deal with many sampling situations. The unit weighs less than 8 ounces and features a handheld syringe design. Easy pushbutton calibration takes only seconds.

(*Science* 283(5400), 1999, 409)

162 Nutrient profile of fresh tomato (per 100 g)

Macro-nutrient	100g fresh	% of RDA
Water	93.1	-
Protein (mg)	2.0	-
Carbohydrates (mg)	2.8	0.9
Fat (mg)	0.2	0.3
Fiber (mg)	1.9	7.6
Energy (kcal)	17	0.9
Mineraux (mg)	100g fresh	% of RDA
Sodium	6	0.3
Potassium	300	8.6
Calcium	13	1.6
Phosphorus	25	3.1
Magnesium	15	4.3
Iron	0.5	5.0
Zinc	0.2	1.3
Vitamin & Carotenoid (mg)	100g fresh	% of RDA
Vitamin C	22	36.7
Vitamin E	0.9	9
Vitamin A	0.117	11.7
β- carotene	0.7	-
Lycopene	3.1	-
Luteine	0.1	-
Vitamin B ₁	0.06	4.0
Vitamin B ₂	0.04	2.4
Vitamin B ₆	0.1	5.0
Niacin	0.6	3.2
Folic acid	39	19.5

(*Indian Food Packer*, 52(6), 1998, 61)

163 Refractometer development

A sanitary refractometer has been developed that accurately measures the concentration of liquids and mixtures within food and drinks processing. Increasing demands on the food and beverage industries to maintain and improve quality and to meet the 3A Sanitary Standard are some of the reasons behind the development of the latest process refractometer, the PR-03-A by K-Patents OY in Finland. "We have built our reputation for in-line liquid concentration measurements within sugar, specialty chemicals and pulp production," says Marja Kivenheimo project manager. "This launch also marks our ambitions to become a significant player in the food and beverage industries."

In continuous process environments, users are looking for instruments that are able to perform accurately, reliably and offer maintenance-free operation. This is why the new instrument has been developed. The range of potential applications are wide as most liquid processes in the food and drinks industry require continuous monitoring of concentration or Brix levels in foodstuffs such as jams, fruit juices, preserves, sauces, milks, beer etc. to help maintain quality and reduce costs. Maintaining the correct Brix value of sugar and sweeteners in confectionery production is important, otherwise consistency and quality of sweets can be affected. Similar control is required for the many

filtration processes found in dairy production. Here, monitoring protein concentration is key to improving process efficiency and uniform product quality.

The PR-03-A refractometer determines the Refractive Index (R.I) of the process solution by measuring the critical angle of refraction which changes with concentration. The critical angle of refraction is measured by a digital CCD (charged coupled device) camera element. K-Patents is believed to be the first company during the 1980's to have implemented the digital camera technology in a process refractometer.

The company has further developed measurement reliability by combining the digital camera with an advanced optical image detection technique. This means that all fixed thresholds have been eliminated to allow full digital measurement. The company has combined the measuring components, light source, prism, detection camera and temperature sensor in a single compact module.

For more information contact:
K-Patents OY, Marja Kivenheimo; E-mail: m.kivenheimo@kpatents.com.
(*Food Technology in New Zealand*, 33(11), 1998, 26)

COMMERCIAL INTELLIGENCE

PRODUCTION (RAW MATERIALS)

164 World cereal production

	1994/95	1995/96	1996/97	1997/98	1997/99 forecast	Change 1998/99 over 1997/98
WORLD PRODUCTION	(..... million tonnes)					(..percent age..)
Wheat	528	548	590	615	606	-1.3
Coarse grains	892	812	923	908	907	-0.1
Rice, milled	362	369	383	388	379	-2.4
All cereals (milled rice)	1782	1729	1895	1911	1892	-2.4
Developing countries	931	960	1026	1007	1021	1.5
Developed countries	851	769	869	904	871	-3.7

(FAO Food Outlook No.4, 1998,2)

165 Production of cereals

The Food and Agriculture Organisation has estimated global production of cereals in 1998 at 2,056 million tonnes. Asia has the largest area under cereals and it is also the biggest producer among the continents, but productivity is the highest in North America (Table I).

The country-wise figures on area and production are given in Table II. India has the largest area under cultivation and India and China have nearly 50 per cent more area under cereals than U.S., which is third on the list but because average productivity in China is double than that of India, total production of cereals in China is double that of India. Even the U.S. output of cereals exceeds that in India. Russia has the fourth largest area under cereal cultivation among the countries in Table I, while in terms of production France ranks fourth- after China, U.S. and India. South Korea and Japan show what effect intensive cultivation can have on farm productivity levels, while productivity levels in Nigeria and Iran are too low.

Table I

Continent	Area (million hectares)	Production (million tonnes)
Africa	94.4	114.2
Asia	324.9	988.2
Europe	132.2	394.9
N.America	80.2	396.2
S.America	31.9	94.9
Oceania	16.44	36.62

Table II

Country	Area (million hectares)	Production (million tonnes)
India	99.45	219.44
China	92.93	447.13
U.S	62.14	349.33
Russia	50.48	47.00
Nigeria	18.76	22.72
Canada	18.03	48.86
Australia	16.27	31.76
Brazil	16.04	41.57
Indonesia	14.55	55.46
Pakistan	12.59	27.44
Bangladesh	11.10	30.16
Thailand	11.28	26.28
Iran	9.32	17.90
France	9.21	20.71
Vietnam	7.75	29.29
Myanmar	6.12	17.13
Egypt	2.64	17.93
Japan	2.20	13.33

{The Hindu, 22 February 1999, 20}

166 Wheat output

Global output of wheat in 1998 is estimated by the Food and Agricultural Organisation to have been 589 million tonnes from 225 million hectares. As in the case of rice, Asia had more than 40 per cent share of the output. It has the largest area under the cereal among the continents. (Table I). Europe and North America come next with Europe's output twice that of N.America. Oceania has more area under wheat than Africa or S.America. Europe has the highest productivity of more than 3 tonnes a hectare exceeding the world average. China

has the largest area under wheat and is also the world's biggest producer. It produces a fifth of the world output (Table II). The third largest area is in India whose output is less than that of the U.S. though the latter has a smaller area. Canada is another major producer and has better productivity than Australia. Brazil produces a million tonnes more than S.Africa. France's productivity is the highest at more than 7 tonnes and Egypt the second best.

Table I

Continent	Area (million hectares)	Production (million tonnes)
World	225.11	589.12
Asia	100.17	253.36
Europe	59.84	182.90
N.America	34.48	92.76
Oceania	11.51	22.12
Africa	11.25	11.83
S.America	7.05	15.77

Table II

Country	Area (million hectares)	Production (million tonnes)
China	30.00	110.00
Russia	26.15	24.80
India	25.60	66.00
U.S	23.92	69.60
Australia	11.46	21.86
Canada	10.56	23.16
Pakistan	8.38	19.00
Iran	7.00	12.00
France	5.24	39.86
Argentina	4.50	10.50
Brazil	1.42	2.49
S.Africa	1.20	1.50

Egypt	1.05	6.09
Bangladesh	0.78	1.80
Japan	0.16	0.57
Korea	0.13	0.16
Myanmar	0.09	0.08
Tanzania	0.07	0.09
Zimbabwe	0.05	0.27

(The Hindu, 8 March, 1999, 20)

167 Production of pulses

The Food and Agriculture Organisation has estimated the world output of pulses at 56.17 million tonnes in 1998 slightly lower than in the previous year. Asia accounts for nearly half of it. This region has also nearly 50 per cent of the global area under pulses (Table I). The rest of the continents are marginal producers of the protein. The data on area and production of individual countries show that India is at the top. Although Indonesia is at the bottom of the list in Table II its productivity is twice the world average. The U.S and Canada have high productivity although they are marginal producers. Tanzania, Iran and the Russian Federation accord low priority to pulses.

Table I

Continent	Area (million hectares)	Production (million tonnes)
World	67.77	96.17
Africa	14.48	7.56
Asia	37.07	27.13
Europe	4.91	9.65
N.America	2.25	4.12
Oceania	2.12	2.34
S.America	4.35	3.13

Table II

Country	Area (million hectares)	Production (million tonnes)
India	24.38	14.52
Brazil	3.43	2.20
Nigeria	3.42	1.70
China	3.10	4.71
Australia	2.08	2.27
Pakistan	1.74	1.20
Myanmar	1.69	1.19
Canada	1.28	2.31
Russia	1.22	1.00
Iran	1.00	0.58
U.S	0.97	1.80
Tanzania	0.75	0.41
France	0.64	3.38
Indonesia	0.54	0.87

(The Hindu, 15 March 1999, 20)

168 All India potato production

Area: '000 Hect; Prod: '000 Mts

Year	Area	Production
1981-82	792.70	9911.80
1982-83	734.80	9955.80
1983-84	805.60	122250.00
1984-85	849.00	12570.06
1985-86	848.20	10695.80
1986-87	825.50	14138.40
1987-88	938.40	14892.50
1988-89	940.00	14770.80
1989-90	941.90	15253.60
1990-91	1135.00	18195.00
1991-92	1239.90	18479.00
1992-93	1231.00	18833.00
1993-94	1230.20	17250.00
1994-95	1322.20	19151.00
1995-96	1491.00	28684.00
1997-98	1200.00	16000.00

(NAFED Marketing Review 28(8-10), 1998, 16)

169 World major oilseeds production

(million metric tonnes)

	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Soybean	117.34	117.83	137.72	124.96	131.65	152.60
Cottonseed	31.60	29.49	32.90	35.93	34.37	33.91
Peanut	23.11	25.23	28.32	28.40	28.98	28.60
Sunflower seed	21.28	20.83	23.48	25.89	24.13	23.44
Rapeseed	25.31	26.80	30.38	34.52	31.44	33.75
Copra	4.92	4.97	5.48	5.03	5.81	5.66
Palm kernel	3.99	4.25	4.61	4.98	5.30	5.38
Total	227.55	229.40	262.90	259.71	261.69	283.34

(Soya and Oilseeds Bluebook, 1999, 331)

170 World meat production

(million tonnes)

	1996	1997	1998 estim.
WORLD TOTAL	208.5	214.2	219.3
Poultry meat	57.7	60.0	61.6
Pig meat	79.5	82.1	85.2
Bovine meat	56.3	7.0	57.4
Sheep meat and goat meat	10.8	11.1	11.5
Other meat	4.1	3.9	3.9
DEVELOPING COUNTRIES	107.8	113.4	117.0
Poultry meat	28.8	30.3	31.4
Pig meat	43.5	46.9	48.5
Bovine meat	25.3	26.2	26.9
Sheep meat and goat meat	7.4	7.7	8.0
Other meat	2.4	2.3	2.3
DEVELOPED COUNTRIES	101.2	100.7	102.3
Poultry meat	28.9	29.7	30.2
Pig meat	36.1	35.2	36.6
Bovine meat	31.0	30.8	30.5
Sheep meat and goat meat	3.5	3.4	3.5
Other meat	1.7	1.6	1.5

(FAO Food Outlook, No. 4, 1998, 19)

171 World fish production

(million tonnes)

	1995	1996	1997 prelim.
China	28.4	32.0	35.0
Peru	8.9	9.5	7.8
Chile	7.6	6.9	6.1
Japan	6.8	6.8	6.7
United States	5.6	5.4	5.5
India	4.9	5.3	5.5
Indonesia	4.1	4.4	4.6
CIS	4.4	4.7	4.7
Others	46.6	46.0	46.1
TOTAL	117.3	121.0	122.0

(FAO Food Outlook, No.4, 1998, 23)

PRODUCTION (INDUSTRIAL)

172 Palm oil production

The dynamic growth in palm oil production in the past 20-25 years is a familiar story. The supply oil has been essential in meeting the demands of a growing global population. Palm comes mainly from Malaysia and Indonesia and is exported particularly to the populous countries of China, India and Pakistan. The current economic and financial crisis in Indonesia has led to a reduction in new plantings and for this and other reasons the supply of palm oil will be affected. Palm oil production is expected to be tight in 1999, to recover considerably in 2000 and 2001 by estimated levels of 2.4 and 1.9 million tonnes and to be followed by further tightening in 2002-04 with estimated increases of only 0.2 million tonnes (2003) and 0.3 million tonnes (2004). Sizeable growth is expected again in 2005. Stagnation in palm exports over the last 3 years has led to increasing exports of soybean, sunflower and rapeseed, so that the

combined export levels of these three oils now exceeds that of palm oil.

Palm oil production and forecasts (millions of tonnes and % of world total):

Year	Indonesia	Malaysia	World total
1980	0.69 (15%)	2.58 (56%)	4.59
1990	2.41 (22%)	6.10 (55%)	11.03
1995	4.22 (28%)	7.81 (51%)	15.19
2000	6.88 (34%)	9.80 (48%)	20.23
2005	9.18 (36%)	11.70 (45%)	25.30

{Lipid Technology, 11(1), 1999, 24}

173 Production of food industries

Food industry	Units	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
Sugar	Thousand tonnes	12047	13277	10562	98700	12610	14781	15303
Tea	Million kg	705	715	735	743	777	762	775
Coffee	Thousand tonnes	128.5	141	100	102	43	9	9
Vanaspati	Thousand tonnes	850	826	893	900	907	974	994
Salt	Thousand tonnes	12645	14169	14021	14898	11356	14034	14991

{The Hindu Survey of Indian Industry, 1998, 468}

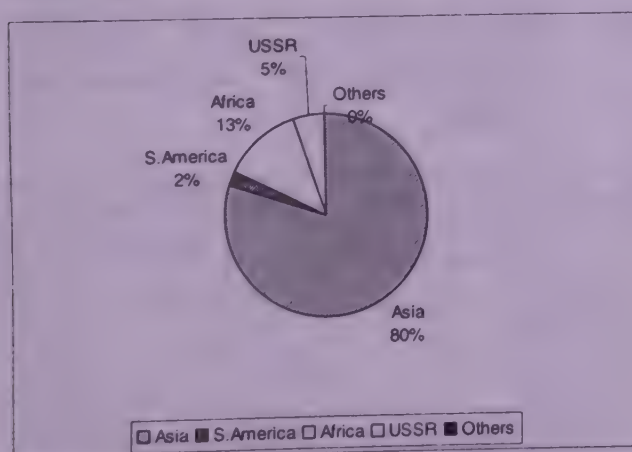
174 World tea production

The world tea output rose by nearly 200 million kg in eight years to 2734 m kg in 1997 as compared to 1989-91 average production. Among continents Asia is the major producer and consumer of the beverage. Chart shows that Asia had a share of nearly four fifth's of global output in 1989-91 and this was even more pronounced in 1997 at nearly 85 per cent. Africa has a 13 per cent share while the USSR had a small 5 per cent share in 1989-91, there is no contribution in 1997 with the collapse of the Soviet Union. S.America which had a marginal two per cent share improved its share a shade in 1997. Looking at countrywise data India is easily the star performer accounting for a third of the global output of tea. Its production has steadily increased over the years. China the second biggest producer has also been improving its

output. These two countries accounted for more than half of global tea output in 1997. Sri Lanka is the third largest producer and has stepped up its output over the years.

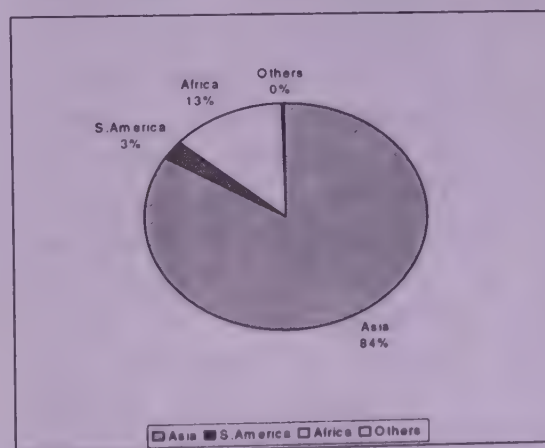
Kenya the fourth largest producer reported a drop in its output in 1997. Indonesia, another key producer turned out of 160 million kg in 1997 up from 159 m kg and 154 m kg in the two previous years. Japan produces around 90 m kg but this is inadequate to meet its domestic demand and it imports a sizeable quantity from Asian nations. Iran and Vietnam are marginal producers. Kenya's productivity is the highest at two tonnes per hectare. The productivity levels of Japan and Iran are on par with India at 1.8 tonnes per hectare, but China's yield is low at 700 kg per hectare.

1989-91: World 2450 m Kg



{The Hindu, 22 March 1999, 20}

1997 : World 2734 m Kg



EXPORT

175 Agricultural exports from Karnataka

(Rs. in crore)

Year	Coffee products	Cashew & cashew kernels	Agricultural processed food products	Total
1997-98	831.00	236.00	160.32	1227.32 (15)
1996-97	750.00	220.00	156.72	1126.72 (17)
1995-96	650.00	84.03	49.49	783.52 (16)
1994-95	550.00	70.00	44.70	664.70 (17)
1993-94	400.00	54.08	30.70	484.78 (16)
1992-93	370.82	21.48	31.93	424.23 (19)

(Figures in brackets are percentage to total exports from Karnataka)

{Kaigarika Varthe, January 1999, 9}

176 India to export 3 million tonnes of wheat

India, buoyed by expectations of a record wheat crop, could spare upto three million tonnes of grain for export this year. "The agriculture ministry's assessment is around 72 million tonnes of wheat output in 1998/ 99 (July/June)," agriculture production commissioner C.R.Hazra said. "Going by this year's production we can go for two to three million tonnes of exports of wheat." India harvested 66.05 million tonnes of wheat in 1997/98. The previous highest wheat output was 69.4 million tonnes in 1996/97. Agriculture ministry officials said the total foodgrain output in 1998/99 was expected to be around 200 million tonnes, an all time record. The country produced 192.4 million tonnes of food grain in 1997/98. Rice output in 1998/99 has been estimated at 82

million tonnes, up from 80.5 million tonnes the previous season. Officials said more accurate output figures for 1998/99 would be available at the end of the two day conference on Tuesday. {The Financial Express, 24 March 1999, 18}

177 Production and price behaviour of potatoes in India

Year	Qty. (in MTs)	Value (in lakh Rs.)
1993-94	7,092	213
1994-95	15,755	622
1995-96	34,422	1889
1996-97	24,935	1715

{NAFED Marketing Review, 28(8-10), 1998, 16}

178 India to be top pepper exporter

India is projected by the International Pepper Community (IPC) as the top pepper exporter of 1999. The IPC's projection comes on heels of India reporting a 20 per cent jump in the production of black pepper in the year, estimated at 57,270 tonnes. India is expected to export 40,000 tonnes of pepper in the current year (1998-99), which will be 9,194 tonne more than last year, according to the Jakarta-based IPC, representing six pepper exporting countries that control 85 per cent of the international pepper market.

The rise in the country's pepper exports will be facilitated by a 1,680 tonne rise in its pepper production. In addition, it has a large carry-over stock from last year's production. Last year, exports were to the tune of 30,086 tonne on a production base of 55,590 tonne last year, according to a senior official of the Spices Board. Indonesia, last year's top exporter with 40,749 tonne, is expected to report a drop in its pepper exports by about 10,750 tonnes. The expected drop in exports is reportedly due to a marked decline in crop to 44,000 tonnes from the last year's harvest of 47,000 tonnes. Further, it has a very low carry-over stock.

{Economic Times, 5 March 1999,18}

179 Export of spices to U.S.A

Item	1996-97		1997-98	
	Qty. (tonnes)	Value (Rs. Crs)	Qty. (tonnes)	Value (Rs. Crs)
Pepper	25,427	219.39	16,233	219.71
Chillies	9,206	42.07	11,773	48.01
Ginger	1,261	5.45	1,571	8.12
Turmeric	2,079	7.68	2,081	9.75
Cumin	895	5.16	2,590	14.67
Celery	2,924	5.99	2,275	4.94
Fennel	659	2.74	1,693	5.96
Curry powder	310	1.93	426	2.31
Spice oils/ Oleoresins	1,095	72.03	923	77.13
Others	3,016	55.31	2,779	34.09
Total	46,872	417.75	42,344	424.69

{Spice India, 11(10), 1998, 7}

IMPORT**180 Increasing oil imports**

(million tonnes)

Year (Nov – Oct)	Total	Palm	sunflower	Soyabean	Rapeseed	Others
1998-99 (Nov '98- Jan '99)	0.81	0.36	0.21	0.10	0.11	0.03
1997-98	2.08	1.47	0.18	0.30	0.09	0.04
1996-97	1.75	1.23	0.41	0.05	0.03	0.03
1995-96	1.48	1.21	0.13	0.07	0.03	0.04
1994-95	0.98	0.68	0.06	0.17	0.02	0.05

*{Economic Times, 15 March 1999,12}***181 US imports of spices**

Year	Qty. (‘000 tonnes)	Value (US\$ Million)
1979	147.9	195.1
1989	227.6	396.8
1994	286.2	434.0
1995	262.7	445.3
1996	304.3	499.6
1997	290.2	549.8

*{Spice India, 11(10), 1998,5}***TRADE INFORMATION****182 Food Connect**

*FoodConnect Australia*TM, developed by the food industry, Supermarket to Asia Council and Telstra is an e-commerce export product developed specifically for the agri-food industry. It was launched by the Prime Minister of Australia, the

Hon. John Howard in Sydney. “*FoodConnect Australia*TM has the potential to open up new export markets, increase the number of Australian companies exporting goods to the world and create new jobs in the food industry,” the Prime Minister said. The goal of *FoodConnect Australia*TM is to connect international food buyers with Australian companies to allow them to source, order, and transport Australian food from anywhere in the country to anywhere in the world in the most time efficient and cost effective way.

It features a comprehensive product catalogue listing over 400 Australian food companies and the food they sell; a pilot supply chain experiment with a group of leading businesses and their international partners; and a general information

hub. The companies participating in the commercial pilot trial of *FoodConnect Australia*TM include: Tassal Limited (salmon exporters/producers); Unilever Australian Export Pty Ltd (processed food); Rashad Aziz Investments Pty Ltd (meat exporter); and Bonlac Foods Ltd (dairy producer). The six month trail will assist *FoodConnect Australia*TM to further develop the service to best meet the needs of the agri-food industry. The aim is to create a dynamic trading service which will enable businesses to manage each step of the export process online, from product selection to customer processing and secure financial transactions.

*FoodConnect Australia*TM is located at www.foodconnect.com.au.
(*Food Australia*, 51(1-2), 1999,7)

183 More patent examiners planned

The Centre has chalked out plans to effect a multi-fold increase in the number of patent examiners in the National Patents Office. An amount of Rs. 70 crores has been earmarked by the Government for modernising the National Patents Office and increasing the number of patent examiners from the existing 30 to 200, according to Dr. R.A.Mashelkar, Director-General, CSIR.

(*The Hindu*, 22 February 1999, 19)

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

184 Use of carry bags from recycled plastics banned

The Union Ministry of Environment and Forests has notified usage rules for recycled plastics under the Environment Protection Act, 1986, prohibiting the usage of carry bags made of recycled plastics. The notification of Recycled Plastics Usage Rules, 1998, was necessitated following a large number of complaints to the Ministry about recycled plastic carry bags, containers and packaging material being used for carrying, storing and packaging of foodstuffs. It was feared that such an unhealthy practice could lead to contamination of foodstuffs on account of the chemicals present in the recycled plastics. As per the notification, while no person will now be allowed to use carry bags or containers made of recycled plastics for storing, carrying and packing the food stuffs, certain conditions will also now have to be followed for using carry bags.

These conditions are subject to four factors: that these carry bags and containers are not pigmented; the minimum thickness of carry bags made of recycled plastic is not less than 25 microns; reprocessing or recycling of plastics is undertaken strictly in accordance with 'Guidelines for Recycling of Plastics' published by the Bureau of Indian Standards and

the end product made out of recycled plastics is appropriately marked as 'recycled' along with the indication of the percentage of use of recycled material and; carry bags and containers made of recycled plastics conform to the specifications mentioned in the Prevention of Food and Adulteration Act and the rules made thereunder.

Further, the new order also notifies that the minimum thickness of carry bags made of virgin plastic will not be less than 25 microns and every State government and Union Territory administration will notify a prescribed authority with such members as may be specified within one month from the date of coming into force of the final rule for implementation. Based on the feedback, the draft rules will be taken into consideration. Any objections or suggestions to them may be forwarded in writing for consideration of the Central Government within a period of 60 days from the date on which copies of the Gazette dated November 28, 1998, are made available to the people.

The objections and suggestions may be sent to the Secretary, Ministry of Environment and Forests, Paryavaran Bhavan, CGO Complex, Lodi Road, New Delhi-110 003.

(Standards India, 10(10), 1999, 249)

185 Genetically engineered food- bane or boon?

A potato may soon replace a pill for curing cholera and tobacco may fight tuberculosis. Biotechnologists worldwide are developing genetically engineered plants they claim would not only provide better quality nutrition, but be also tailored to produce antibodies, vaccines and hormones of use to man. "There is a great revolution in nutrition which our country can benefit from, says Prof. Indira Nath, Department of Biotechnology, All India Institute of Medical Sciences (AIIMS). Technically it is feasible to develop and grow such plants on a large scale. They appear to be safe and make possible cheaper therapeutics for countries like ours. They make injections for vaccines unnecessary as they can be eaten.

While such transgenic futuristic foods are poised to tackle diseases like cholera, which affect ten million world wide per year, there is a strong lobby against the use of such technology from farmers and environmentalists who fear it may be unsafe for the consumer, damage the environment or give some people the excuse to chew tobacco. There is also the fear that people who are clever in producing such genes may produce harmful genes. The president of the Nutrition Foundation of India Dr.C.Gopalan says. "These are being driven by commercial interests. Anything commercial is attractive but we must evaluate every step and see

the interest of the common man and the developing nations". Plants are cost-effective requiring only soil minerals, water, nitrogen, sunlight energy and carbon dioxide for biosynthesis of all constituent proteins. Plant-based production of biologically active recombinant proteins such as pathogen-specific antibodies and vaccine antigens enable oral delivery through consumption of edible plant tissues.

As a result, over one-half of the world soyabean harvest and about one-third of the corn harvest now comes from plants engineered with genes for herbicide or insect resistance. These commodities find their way into hundreds of foods, such as breakfast cereals, cooking oils, soft drinks etc. "We now have multi-drug resistance to diseases but the cost becomes so huge, which is why we are looking at immunity and therapy in a less expensive manner. This is why government has consciously gone into oral polio immunisation" says Prof. Nath. Advances in recombinant DNA technology have enabled plant molecular biologists to transfer a remarkable variety of foreign genes encoding therapeutic proteins into plant species such as potato and tobacco. Though transgenic potatoes and tobacco are not yet into commercial production, and they are still in the trial stage, traditional nutritionists are facing enormous challenge.

{The Financial Express, 17 February 1999, 20}

186 IFT to provide expertise on food science and technology to FDA

The Institute of Food Technologists (IFT) entered into a five-year contract with the U.S. Food and Drug Administration (FDA) to provide scientific evaluations and reviews on issues related to food safety, food processing, and human health. IFT will study and assess current and new information in these areas to enable the agency to develop timely food safety policies and regulations based on the most advanced science. "The state-of-the-art science, particularly in food processing and packaging, that IFT brings to this contact will augment the expertise of FDA scientists and be invaluable to us in protecting the health of American consumers," said Joseph A. Levitt, Director, FDA Centre for Food Safety and Applied Nutrition.

The FDA will issue task orders throughout the contract's term, effective until September 29, 2003. The agency's first task has charged IFT with reviewing and analyzing emerging non-thermal food processing technologies that may potentially be used for pasteurization or sterilization. Such technologies include, but are not limited to, high pressure processing, pulsed electric fields, pulsed X-rays or ultraviolet light, ohmic heating, combined ultraviolet light and low concentration hydrogen peroxide, submegahertz ultrasound, inductive heating,

filtration, and oscillating magnetic fields. IFT has until March 29, 2000, to complete this project. Evaluating innovative strategies and technologies to control foodborne pathogens and complement the HACCP system is a high priority of the FDA.

IFT plans to involve a multi-disciplinary advisory board of leading scientists from around the world to identify a panel of experts who will

conduct reviews and analysis for each task. All work will take into account risk assessment, food safety objectives (determinations of the microbiological, physical, and chemical conditions in foods that provide acceptable consumer protection), and management of microbial hazards in international trade.

{Food Production/ Management, November 1998, 16}

187 Large Cardamom Grading and Marking Rules, 1997

G.S.R. 242.- Whereas the draft Large Cardamom Grading and Marking Rules, 1997 were published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act 1937 (1 of 1937), under the notification of the Government of India in the Ministry of Rural Areas and Employment number 18011/6/95-M.II dated 1st September, 1997 as G.S.R. 358 dated the 25th October, 1997 at page 1 in the Gazette of India; Part II, Section 3, Sub section (i), inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of a period of forty five days from the date on which the copies of the Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 25th November 1997;

And whereas the objections and suggestions received from the public in respect of the said draft rules have been duly considered by the Central Government;

Now therefore, in exercise of the powers conferred by Section 3 of the Agricultural Produce (Grading and Marking) Act 1937, the Central Government hereby makes the following rules, namely-

RULES

1. Short title and application.- (1) These rules may be called the Large Cardamom Grading and Marking Rules, 1998.
- (2) They shall apply to the Large Cardamom (*Anomum Subulatum* Rozburgh);

(3) They shall come into force on the date of their publication in the Official Gazette.

2. Definition- In these rules, unless the context otherwise requires.-

- (a) "Agricultural Marketing Adviser" means the Agricultural Marketing Adviser to the Government of India;
- (b) "Authorised packer" means a person or a body of persons who has been granted certificate of authorisation to grade and mark the large cardamom whole, seed and/or seed powder in accordance with the provisions of these rules;
- (c) "Certificate of Authorisation" means a certificate issued under rule 3 of the General Grading and Marking rules, 1988;
- (d) "Grade designation mark" means the Agmark label or the Agmark replica referred to in sub-rule(1) of Sub-rule(2) or of rule 5, as the case may be, of these rules;
- (e) "Schedule" means a schedule appended to these rules;

3. Grade designations-The grade designations shall be the name of the grades to indicate the quality of large cardamom whole, seed and/or large cardamom powder as set out in column 1 of Schedules II to IV.

4. Definition of quality- The quality indicated by such grade designations shall be as set out against each grade designation in columns 2 to 10 of Schedule II and III and columns 2 to 8 of Schedule IV.

5. Grade designation mark- (1) The grade designation mark shall consist of Agmark label as specified in Schedule I-(A) and shall specify the name of the commodity, grade designation and a design consisting of an outline map of India with the word "AGMARK" and figure of the rising sun resembling the rising sun resembling the one as set out in Schedule I-(A);
or

(2) Notwithstanding anything contained in sub-rule(1), the Agricultural Marketing Adviser or an officer authorised by him in this behalf may, subject to the conditions specified in sub-rule(4) of the General Grading and Marking Rules, 1988 permit an authorised packer to use Agmark replica as specified in Schedule I-(B) consisting of a design incorporating the number of certificate of Authorisation, the word "AGMARK", the name of the commodity and grade designation, instead of Agmark label.

6. Method of packing- (1) Whole large cardamom capsules shall be packed in new, clean, sound and dry wooden cases suitable lined with water proof paper/craft paper/polyethylene liner or bags made of jute, cloth laminated with polythylene or polypropylene or high density polythylene bags/pouches.

- (2) Cardamom seeds shall be packed in new, clean, sound and dry cotton bags, wooden cases lined with polyethylene/ water proof paper or containers made of glass, tin plates, aluminium or in pouches made of laminated metallised/ multilayered food grade quality plastic materials.
- (3) Large cardamom powder shall be packed in new, clean, sound and dry containers made of tin, glass or in pouches made of laminated/extruded metallised/multilayer food grade plastic materials.
- (4) The containers shall be clean, sound and new and shall not be composed wholly or partly of any poisonous or deteriorious substances which leads the contents injurious to health;
- (5) Containers and packing material shall be free from insect infestation, fungus contamination and 'rable or obnoxious smell and substance which may damage the contents;
- (6) The net weight of the large cardamom capsules, seeds and powder packed in a container shall be 25 gms, 50 gms, 100gms, 500 gms, 1 kg and thereafter in multiples of 500 gms, as per the Standards of Weights and Measures (Packaged Commodities) Rules, 1977;
- (7) Each container shall be securely closed and suitably sealed;
- (8) Suitable number of consumer packs containing graded material of the same grade and from the same lot batch may be packed in master container such as wooden cases, bags and cardboard cartons.
7. Method of Marking-(1) A grade designation mark shall be securely affixed to or printed on each container of large cardamom whole/seed or powder in a manner approved by Agricultural Marketing Adviser or an Officer authorised by him in this behalf in accordance with rule 11 of the General Grading and Marking Rules, 1988;
- (2) In addition to the grade designation mark, the following particulars shall be clearly and indelibly marked on the label and/or on the package;
 - (a) Name and address of the packer;
 - (b) Place of packing;
 - (c) Date of packing, in month and year;
 - (d) Lot/ batch number;
 - (e) Net weight;
 - (f) Grade;

- (g) Maximum retail price (inclusive of all taxes only for domestic market);
- (3) The ink used for marking shall be of such quality which does not contaminate the product;
- (4) The authorised packer may after obtaining prior approval of the Agricultural Marketing Adviser or any officer authorised by him in this behalf, in accordance with rule 11 of the General Grading and Marking Rules, 1988; mark his private trade mark in the package;

Provided that the same does not indicate the quality or grade other than that indicated by the grade designation mark affixed to the graded package in accordance with these rules.

8. Special conditions for grant of Certificate of Authorisation.- Notwithstanding anything contained in sub-rule(8) of rule 3 of the General Grading and Marking Rules, 1988; the Certificate of Authorisation for grading and marking of large cardamom whole, seeds and or large cardamom powder, shall not be granted if:-

- (a) The authorised packer have not either set up his own laboratory manned by a qualified chemist approved by the Agricultural Marketing Adviser or an Officer authorised by him in this behalf in accordance with rule 9 of the General Grading and Marking Rules, 1988 for testing the quality of large cardamom capsules, seeds and/or large cardamom powder in accordance with the specified quality standards or does not have an agreement with an approved laboratory for the purpose;
- (b) The authorised premises for processing, grading and packing are not maintained in perfect hygienic and sanitary conditions;
- (c) The personnel engaged in these operations are not in sound health and free from any contagious disease

SCHEDULE--I(A)

[See rule 5(1)]

Grade designation mark
(Design of Aomark label)**SCHEDULE—I(B)**

[See rule 5(2)]

Grade designation mark
(Design of Agmark Replica)

NAME OF COMMODITY.....

GRADE

SCHEDULE-II

(See Rules 3 and 4)

Grade designations and definition of quality of large cardamom whole capsules

Definition of quality								
Special requirements								
Grade designations	Moisture per cent by mass (Max)	In-organic extra-neous matter per cent by mass (Max)	Organic extra-neous per cent by mass (Max)	Immature and shrivelled capsules per cent by mass (Max)	Insect damaged capsules per cent by mass (Max)	Empty and malformed capsules per cent by mass (Max)	Volatile oil ml/ 100 gm. (on dry basis) (Max)	Mass in grams per litre (Max)
1	2	3	4	5	6	7	8	9
Grade-I	10.0	0.5	0.5	6.0	3.0	5.0	2.0	350
Grade-II	12.0	1.0	1.0	8.0	5.0	8.0	1.0	300
General requirements								
10								

Large Cardamom capsule shall:-

- (1) be the dried, nearly riped fruits (capsules) obtained from the perennial herbaceous plant botanically known as "AMOMUM Subulatum Rozburgh" belongs to Zingiberaceae family;
- (2) be ovoid and more or less triangular shaped having ribbed appearance;
- (3) be of colour ranging from brown to pink
- (4) have characteristic taste and colour with pleasant spices flavour;
- (5) be in sound and merchantable condition and fit for human consumption in all respects;
- (6) be free from off-flavour, rancid taste, mustiness, mould growth, insect infestation, rodent contamination visible to naked eyes and added colouring matter;
- (7) comply with the restrictions in regard to aflatoxin content, metallic contaminants and insecticide residue as specified under the Prevention of Food Adulteration Rules, 1955 as amended from time to time;
- (8) comply with requirements specified under the Environment Protection Act, 1986 and rules made thereunder for application of "ECOMAR".

Explanation:-

- (1) Empty and malformed capsules-mean capsules which are without any seeds or which are scantily filled with seeds. For this purpose 100 capsules selected at random from the sample shall be opened out and the number of empty and malformed capsules counted.
- (2) Immature and shrivelled capsules-mean capsules which are shrivelled and not fully developed;
- (3) Insect damaged capsules-mean capsules which are wholly or partially bored or damaged by insects;
- (4) Inorganic extraneous matter- means sand, stones, earth and other inorganic extraneous matter.
- (5) Organic extraneous matter-means vegetable matter of plants including cardamom amomum, the proportion of pieces of calyx and stalk.
- (6) Mass per litre-means the mass of large cardamom capsule contained in one litre measuring cylinder.

SCHEDULE-III (See Rules 3 and 4)

Grade designations and definition of quality of large cardamom seeds

Definition of quality								
Special requirements								
Grade designations	Moisture per cent by mass (Max.)	In-organic extra-neous matter per cent by mass (Max.)	Organic extra-neous per cent by mass (Max.)	Insect damaged seeds per cent by mass (Max.)	Light seeds/ brown or red seeds per cent by mass (Max.)	Total ash per cent by mass(on dry basis) (Max.)	Volatile oil ml/ 100 gm. (on dry basis) (Max.)	Mass in grams per litre
1	2	3	4	5	6	7	8	9
Grade-I	10.0	0.3	0.5	2.0	5.0	8.0	2.0	400
Grade-II	12.0	1.0	1.0	3.0	8.0	8.0	1.0	350
General requirements								
10								

Large Cardamom capsule shall:-

- (1) be obtained by decorticating the capsules of cardamom amomum (*Amomum Subulatum* Roxb) and separated out seed for packing;
- (2) be fresh clean, in sound and merchantable condition and fit for human consumption in all respects;
- (3) have fresh taste and aroma normally associated with the characteristics of the commodity;
- (4) be free from off-flavour, rancid taste, mustiness, mould growth, insect infestation, rodent contamination and added colouring matter;
- (5) comply with the restrictions in regard to aflatoxin content, metallic contaminants and insecticide residue as specified under the Prevention of Food Adulteration Rules, 1955 as amended from time to time;
- (6) comply with requirements specified under the Environment Protection Act, 1986 and rules made thereunder for application of "ECOMARK".

Explanation:-

- (1) Inorganic extraneous matter- means sand, stones, earth and other inorganic extraneous matter.
- (2) Organic extraneous matter-means vegetable matter of plants including cardamom amomum, the proportion of pieces of calyx and stalk.
- (2) Insect damaged means seeds that are wholly or partially bored or damaged by insects;

- (3) Light seeds-means seeds that are immature and shrivelled
- (4) Mass per litre-means the mass of large cardamom seeds contained in one litre measuring cylinder.

SCHEDULE-IV
(See Rules 3 and 4)

Grade designations and definition of quality of large Cardamom seed powder

Grade designations	Definition of quality					
	Special requirements					
	Moisture per cent by mass (Max.)	Total ash per cent by mass (on dry basis) (Max.)	Acid insoluble ash per cent by mass (on dry basis) (Max.)	Crude fibre per cent by mass (on dry basis) (Max.)	Non volatile ether extract per cent by mass (on dry basis) (Min.)	Volatile oil ml/ 100 gm. (on dry basis) (Min.)
1	2	3	4	5	6	7
Grade-I	10.0	5.0	1.0	12.0	4.0	1.5
Grade-II	12.0	8.0	1.5	15.0	2.0	1.0
General requirements						
8						

Cardamom amomum seed powder shall-

- (1) be the material obtained from the seeds separated from the capsules of "Amomum Subulatum Rozburgh";
- (2) have fresh taste and aroma normally associated with the characteristics of the product;
- (3) be in sound and merchantable condition and fit for human consumption in all respects;
- (4) be free from off-flavour, rancid taste, mustiness, mould growth, insect infestation, rodent contamination and added colouring matter;
- (5) comply with the restrictions in regard to aflatoxin content, metallic contaminants as specified under the Prevention of Food Adulteration Rules, 1955 as amended from time to time.

(Gazette of India, Part II, Section 3, Subsection (i), No. 46, 1998, 918-922)

188 Agricultural Produce – Grading and Marking Rules

G.S.R 684(E).- In exercise of the powers conferred by Section 6 of the Agricultural produce (Grading and Marketing) Act, 1937 (1 of 1937) and in supersession of the notification of the Government of India number S.O. 2661 dated, the 29th October, 1960, except as respects things done or omitted to be done before such supersession, the Central Government hereby declares that the provisions of the said Act shall apply to the following articles, namely:-

Condiments, spices and their extracts:

1. Coriander
2. Cumin
3. Fennel
4. Fenugreek
5. Celery
6. Aniseed
7. Bishopweed
8. Caraway
9. Dill
10. Cinnamom
11. Cassia
12. Garlic
13. Curry leaf
14. Kokam
15. Mint
16. Mustard
17. Parsley
18. Pomegranate seed
19. Saffron
20. Vanilla
21. Tejpat
22. Pepper long
23. Star Anise
24. Sweet flag

25. Greater galanga
26. Horse-raddish
27. Caper
28. Clove
29. Asafoetida
30. Cambodge
31. Hyssop
32. Juniper berry
33. Bay leaf
34. Lovage
35. Marjoram
36. Nutmeg
37. Mace
38. Basil
39. Poppy seed
40. Allspice
41. Sage
42. Rosemary
43. Savory
44. Thyme
45. Oregano
46. Terragon
47. Tamarind
48. Edible starch
49. Edible common salt
50. Amchoor
51. Sesame seed

(Gazette of India (Extraordinary), Part II, Section 3, Subsection (i), No. 448, 1998, 2)

189 Hazards of aluminium

Recent research on aluminium has established that cooking in aluminium vessels can affect our health in various ways. Aluminium, being the third most common element on earth, is cheap as compared to other metals. A good conductor of heat and electricity, it is also malleable and ductile. It can be pressed to a hard like substance. Due

to these factors, aluminium is widely used in industries and for cooking in several households.

When food is cooked in an aluminium vessel, a part of the metal gets dissolved in minute quantities and enters the body through food. The greatest amount of leaching (percolation of a liquid through some material) occurs when the acidic food is cooked in aluminium vessels or stored in them. Tamarind, lemon and tomato that are commonly used in our daily food are highly acidic in nature. Further the risk of corrosion increases, when food is cooked over a long time and over a high temperature. In fact aluminium, like other minerals, is present in our bodies, though there is no evidence that it is an essential element.

We all consume aluminium everyday through water, food, fruits, vegetables, medicine and cosmetics. Studies by scientists have indicated that aluminium binds to the body's chemical energy and could thus interfere with the body's energy storage system. Many researchers now believe there is enough evidence to conclude that aluminium is probably a significant co-factor in the development of Alzheimer's disease. It is found that aluminium damages nerve cells in the brain. Animal experiments have shown that injections of aluminium into the brains of cats produce memory loss. Natives of certain regions where there are high levels of aluminium in soil and water, suffer from an increased

frequency of neurological diseases in which their brains develop aluminium containing lesions, similar to those in Alzheimer's victims. It is better to avoid feeding infants with tinned milk powder which comes in aluminium containers. A cast iron pan is a better alternative to a non-stick one. Aluminium intake also affects a malfunctioning kidney.

Aluminium combines with different elements like oxygen, sulphur and silicon to form a variety of aluminium containing compounds. Some of these are absorbed by the body at a much higher rate. Alum, is an aluminium compound which is commonly used in purification of water. Aluminium compounds are usually the active ingredients in anti-perspirants and these compounds are absorbed through the skin and should be avoided.

If an aluminium vessel is to be used for cooking, make sure it is anodized aluminium (coated); Never use a high flame when cooking in aluminium. Higher temperatures cause greater leaching; The risk is less when water-based food is cooked. As far as possible, use a wooden spoon to stir food being cooked in aluminium vessels; Do not cook acidic foods in aluminium vessels. The risk of leaching multiplies greatly. Salt also reacts with aluminium. So transfer cooked food into a stainless steel container before adding salt; Avoid boiling tea or coffee for long periods in aluminium vessels. Avoid storing

cooked food in aluminium vessels, especially acidic foods.

(*Science Express*, 6 April 1999, 6)

190 New and revised Indian Standards

IS 2347:1987	Domestic pressure cookers
IS 2566:1993	Textiles- b-twill jute bags for packing foodgrains
IS 10325:1989	Square tins – 15 kg for ghee, vanaspati, edible oils and bakery shortenings
IS 10633:1986	Vanaspati
IS 12650: 1989	Jute bags for packing foodgrains 50 kg
IS 13334 (Part 1): 1992	Skim milk powder: Part 1 Standard grade
IS 13334 (Part 1): 1992	Skim milk powder: Part 2 Extra grade

(*Standards India*, 12(10), 1999, 252-257),

NEW INDUSTRIES AND COMPANY NEWS

191 Osmotic dehydration plant to process fruits

An osmotic dehydration pilot plant has been designed and developed recently for dehydration of fruits. The pilot plant at the College of Agricultural Engineering, TNAU,

Coimbatore consists of an osmotic reactor, mixing chamber, pumping system and a drying unit. Osmotic dehydration can be carried out in an osmotic reactor. Fruit slices are immersed in concentrated sucrose syrup in the reactor. The mixing chamber is used for preparing osmotic syrup and is also used for heating and mixing the osmotic syrup during the process. The pumping system circulates the osmotic syrup into the reactor to maintain uniformity of concentration. The osmosed fruit slices are then dried to a safe moisture content for storage.

To operate this pilot plant, 40 litres of osmotic syrup (60 B sugar syrup) is needed. Forty litres of the sugar syrup is prepared by mixing 31 kg of sugar and 20.5 kg of water in the mixing chamber. The water in the mixing chamber is heated to 60 degrees Celcius and the impeller is rotated at 50 rotations per minute. Sugar is added continuously and the impeller is rotated to obtain a clear sugar syrup. The fruit slices are taken in the osmotic reactor.

The temperature of the osmotic syrup is maintained at around 50 degrees. The syrup is pumped to the reactor and the volumetric flow rate of

pumping is maintained at 41 per minute by adjusting the bypass valves. The fruit holding pan has to be immersed in the syrup and the flow rate of the syrup has to be maintained at 4 litres per minute. A continuous flow has to be maintained for five hours. The sugar syrup should be maintained at a constant level in the osmotic reactor by adjusting the inlet and outlets. The impeller has to be operated continuously till complete osmotic dehydration of the fruits. The capacity of the pilot plant is five kg of fresh fruits per batch. The plant can be used for the dehydration of a variety of fruits like banana, papaya, grape, pineapple and mango.

{The Hindu, 18 March 1999, 24}

192 Bulmer installs bottle plant

Cider-maker, H.P.Bulmer has installed an in-house plant for blowing PET bottles and a Crown Simplistic Ring Jet air conveyor for handling them. The company previously bought-in all its PET bottles fully-formed. By buying PET preforms, from Schmalbach Lubeca in Gresford near Wrexham, potential savings are claimed to be in the region of £720,000.

{Food Manufacture, February 1999,8}

193 India, France to set up laboratory for water science

India and France are to set up a joint laboratory in water science, according to Bertrand Fleutiaux, the counsellor for Science and Technology in the French Embassy in Delhi.

Fleutiaux said, the scientists and researchers of both the countries are scouting for laboratories to set up water cells that would later grow to full-fledged joint research programme in underground water location management and quality control. The French and Indian scientists would first identify the common areas of research and then select specific projects, which are mutually beneficial to both the countries.

“All projects would have a definite time-frame. Financial and infrastructural details are being worked out”. The water research laboratory is part of the Indo-French scientific collaboration. The other two areas of research are in bio-technology and information.

{The Financial Express, 24 March 1999,18}

194 Dhal mill at Paruchuru inaugurated

A dhal mill of Balaram Khadi and Village Industries (KVIC), one of the directly aided institutions of the KVIC which is under the jurisdiction of State Office, Hyderabad was inaugurated by Shri. Battula Brahma Reddy, Director, Civil Supplies Department, Government of Andhra Pradesh at Paruchuru in Prakasam district.

{Jagriti, 42(22), 1998,4}

PERSONALIA

195 New Director for UK Institute of Food Research

The UK Institute of Food Research has appointed a new Director, Professor Peter Schroeder, who was previously Director of research and development at the Nestle R & D Centre in York, UK. His career in food research has also included senior appointments with Unilever, Kraft Foods and Rowntree Plc. For the last ten years he has had responsibility for Nestle's global research and development programme in chocolate, confectionery and biscuits.

{Lipid Technology, 11(1), 1999, 4}

196 New Executive Director of International Pepper Community, Jakarta

Mr. K.P.G.Menon, Director (Marketing), Spices Board has been appointed Executive Director of the International Pepper Community, Jakarta, Indonesia. He is the second Indian to head this international organisation of eight pepper producing countries which was set up in 1972. The International Pepper Community is currently in the process of enlarging its scope to become the International Spice Community. Mr.Menon is relinquishing charge as Director of the Spices Board after putting in 34 years of service in the Spice Export Promotion Council and the Spices Board.

{Spice India, 11(12), 1998,6}

FORTHCOMING CONFERENCES AND TRAINING PROGRAMMES

197 Food Allergens Conference will be held during July 14-15, at Hotel Sofitel (O'Hare), Chicago, Illinois, and is sponsored by Food Allergy Research & Resource Program, part of the Department of Food Science & Technology and the Food Processing Centre, University of Nebraska.

198 12th International Carotenoid Symposium, 18-23 July 1999 held at Cairns Convention Centre, Queensland will be the first held under the International Carotenoid Society, founded at the last symposium in Leiden in 1996.

For further information contact: Remington Consulting, email: markrem@azemail.com.au, web: [www.carotenoid.uconn.edu/cairns-cairns-symp.html](http://www.carotenoid.uconn.edu/cairns/cairns-symp.html).

199 Institute of Food Technology Annual Meeting and Food Expo. will be held during July 24-25 at Chicago.

200 IAMFES 86th Annual Meeting during August 1-4, 1999 at Dearborn, Michigan a leading food safety conference, will comprise of professional educational opportunities such as: symposia, poster and technical sessions, a general session, business meeting, committee meetings, educational exhibits, awards banquet, and social events.

201 The 18th International Conference on Coffee Science, ASIC

'99, is to take place between August 2-6, 1999 at Finlandia Hall, Helsinki, Finland.

202 AOCS Conference and Exhibition on New Developments in Food Lipids will be held during August 1999 at Toronto, Canada. Conference highlights include: marketing and nutrition, oil chemistry and applications, confectionery fats, functional foods, research poster session and industry displays.

203 18th International Symposium on plant essential oils and extracts will be held during September 1-2 at the Centre Culturel et de Congres Pierre Gassendi. For further information contact: Secretariat, Information, email : APPAM.Marylou@wanadoo.fr.

204 Agritech-99-Israel, the world's leading international exhibition for agriculture, agrotechnologies and agri-industry will be held during 5-9 September at Haifa, Israel. Organised by the Ministry of Agriculture, the Export Institute and the Ministry of Industry and Trade, AGRITECH'99 promises to be bigger, better and most varied agricultural exhibition. More than 1,00,000 visitors from more than 100 countries are expected and over 400 exhibitors from the world's agricultural leader countries will exhibit their products.

205 Food Micro 99 sponsored by International Association of Milk, Food and Environmental Sanitarians Inc (IAMFES) will be held between

September 13-17 at Veldhoven, Netherlands. Food Micro 99 is primarily for individuals working in food microbiological research and those who are studying food microbiology as well as for professionals responsible for the production of (safe) food and authorities involved in safe food regulation. For further information contact: Dr. Leon Gorris, Unilever Research Laboratory, Vlaardingen, Postbus 114, 3130 AC Vlaardingen, The Netherlands. Email: leon.gorris@unilever.com.

206 The Asian industrial expo (AIE 99) is scheduled to be held at Hong Kong convention and exhibition centre from September 15-18, 1999 concurrently with the 13th International Packaging and Printing machinery and materials Exhibition for Asia(Pack print expo'99). This covers newest packaging and printing machinery, equipment and materials. AIE '99 and Pack print expo '99 will be the premier platforms for the industrialists who are eager to get contact with top visitors and make direct trade contact. Exhibition booths are now available for reservation.

207 The 1999 Tea & Coffee World Cup will be held at Montjuic II, Barcelona, Spain during September 26-28, 1999.

208 Food and Cancer Prevention III is being organised by Institute of Food Research, Reading, Norwich, U.K from September 6-9, 1999. For

further information contact:
Communications Office, Institute of
Food Research, Reading, Norwich
Research Park, U.K NR 4 7 UA.

209 Millenium Congress on the
Food Chain will be held at the
University of Leeds, U.K from
September 13-16. It is organised by
the Royal Society of Chemistry, Food
Chemistry group. For further
information contact: Prof. B.L.
Wedziche. E-mail:
b.l.wedzicha@leeds.ac.uk.

210 The International Congress of
Refrigeration will be held from
September 19-24 in Sydney, Australia
and is organised by the International
Institute of Refrigeration. For further
information contact: ICR '99
Secretariat, 52 Rosslyn Street, West
Melbourne, Victoria 3003, Australia.

211 The International Centre for
the Training of Rural leaders (ICTRL),
in Yodhagama, Embilipitiya, trains
approximately 5000 rural leaders. A
training facility in food processing is
established within ICTRL, at the
Cathy-Rich Memorial Food Processing
Training Unit.

The objective of the training
programme is to enable poor people
engaged in micro and small-scale food
processing to develop skills and
increase their access to information.
The number and profitability of small-
scale food processing businesses in Sri
Lanka and in the region will increase,
thereby stimulating rural
employment, self sufficiency, and

entrepreneurial activity. The annual
training of trainers course is a
combination of business development
and food technology, using a mixture
of classroom sessions and fieldwork.
It is a five-week residential course
conducted in three phases with
intervals to allow the trainees to use
the knowledge gained in their work.

Short courses on specific
technologies or product areas are
conducted for small-scale
entrepreneurs and the training
package is specifically designed to suit
the requirements of the requesting
organizations/ entrepreneurs. One
day course for entrepreneurs focus on
specific technological processes and
products. Participants also have
direct access to resources and services
available at the training unit. The
Regional Training Programme offers
training in small-scale food processing
for extension workers/ officials who
support grassroots-level development
organisations throughout Asia.
Programmes for university/ affiliated
colleges offer training in small-scale
food processing as requested by the
respective institutions. Support and
follow up work is a part of the
training.

212 Baking qualifications upgrade

The New Zealand Engineering
Food & Manufacturing Industry
Training Organisation(ITO) is
launching new qualifications for the
baking industry. The qualifications
mark the change from a 'time served'

based qualification, to one which is competency based. The new qualifications have been designed for the baking industry, ensuring that training is carried out to national standards. The National Certificates will be recognised both nationally and internationally. It gives employees access to flexible skill pathways and the opportunity for second chance learning for those that have not previously had access to national qualification.”.

The industry has developed qualifications which will be registered on the National Qualifications Framework. The qualifications will encompass all strands of the industry from the craft baker to the supermarket and plant bakers. They will also allow those working in the industry to build towards a qualification. The Level 2 National Certificate is aimed at process workers and those carrying out a limited range of tasks within a bakery to a Level 4 National Certificate, which will replace the current Baking Trade Certificate qualification.

Four qualifications have been designed. They are:

- National Certificate in Baking Level 2
- National Certificate in Baking Level 3
- National Certificate in Plant Baking Level 4
- National Certificate in Craft Baking Level 4

The qualification will combine on job learning with distance learning and block courses. On job learning will be assessed in the workplace, while off job training will be assessed by the providers involved. The ITO is developing comprehensive manuals for the employer and trainee which will help to guide them through the qualifications.

For further information contact: NZ Engineering Food & Manufacturing Industry Training Organisation, New Zealand, Karen Davies,
email: k.davies@nzefmito.org.nz

NEW PERIODICALS

213 Processed Food India: new journal

An in-house journal of the Ministry of Food Processing Industries, Government of India has been conceived since March 1999. It provides a brief catalogue of Ministry related events and larger happenings in country's processed food sector. The feedback from the processed food industries through the journal would help the Ministry to realise its own identity and potential.

For further information contact: Ministry of Food Processing Industries, Panchsheel Bhawan, August Kranti Marg, New Delhi – 110 049. Email: mofpi@hub.nic.in.

SPECIAL ARTICLE

Traditional processing of meat and poultry products*

Meat has been consumed as a part of diet by man since pre-historic times and is an excellent source of high quality proteins and various micronutrients. In spite of religious taboos and socio-economic constraints, it still finds a prime place in the diet of over 70% Indians. Though the meat industry in our country is yet to become a part of organized sector, its contribution to the national exchequer is significant. In terms of financial contribution at present meat and meat products account to around Rs. 17,260 crores annually to the Indian economy (Rao 1998). Most of the meat produced in India is for domestic consumption and only a small part of it is exporting. The export and processing of meat and meat products are still to gain momentum.

Diversity in tradition and culture among different communities in India has resulted in large variety of traditional meat products. Moreover, Arabs, Mughals and Persians have brought many interesting products, particularly different varieties of kababs and tandoori chicken. These products have become traditional products over the passage of time and they are being widely consumed all over the country. Traditional processing of various meat and poultry products has resulted into development of products with unique sensory attributes. Based on the availability of raw materials, people have developed taste to particular commodities and in the process have developed various specialty products traditional to their regions and because of this reason these products vary from region to region and place to place.

Recently the demand for the traditional meat products is increasing due to rapid urbanization and industrialization in the country. In the recent past, the researchers at CFTRI and IVRI made some attempts for standardization of traditional products profiles. However, no systematic efforts were made to describe the indigenous and traditional meat and poultry products at one place. Many have described different culinary practices for different products. In this article an attempt has been made to project the salient features of traditional processing of some popular indigenous meat products of different regions of the country.

**{ 'Food Digest' acknowledges the authors V.Keshava Rao, P.K.Mandal and U.K.Pal of the Department of Livestock Products Technology, Rajiv Gandhi College of Veterinary and Animal Sciences, Kurumbapet, Pondicherry, for their permission to reproduce this article}*

Some specialty traditional meat products of Northern including Kashmir valley

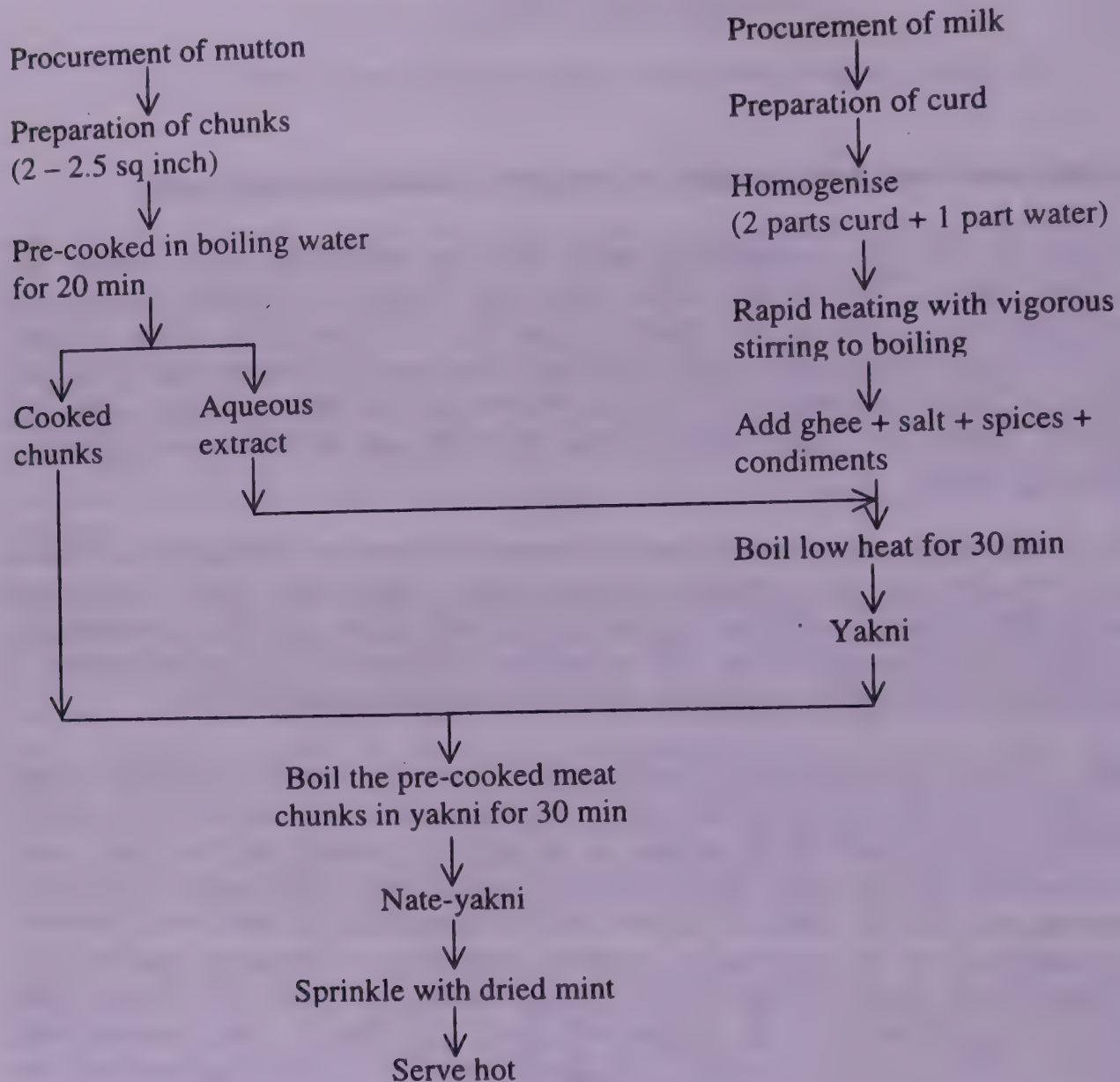
Kashmir valley is very rich in producing highly delicious indigenous meat products viz. Goshtaba, Nate yakhni, Tabak Manss, Rista, Aba gosh, Roganjosh, Kababs, Dopyaza *etc* mainly using mutton or lamb as raw materials (Dar 1977, Ahmed 1986). Some of these products are of Persian origin while others have been developed in Kashmir during the past few centuries. In Northern plane of the country tandoori chicken, butter chicken, meat and chicken pickles, korma, curry and a large varieties of kababs and biriyani can be listed as traditional meat products.

Goshtaba : Deboned meat from young yearling lambs is subjected to besting with a wooden hammer on a wooden slab till it becomes soft and tender. The tender meat is mixed with minced fat and shaped into round balls of quite big size called goshtaba. These goshtabas are cooked in gravy containing curd, water, salt, spices and condiments. The resulted product is juicy, tender and flavorful which is generally served and consumed along with rice.

Nate-yakhni : This is the most popular and commonly processed product from mutton and possesses a peculiar blend of curd and meat flavor. Mutton chunks of about 2 - 2.5 sq. inches are precooked in boiling water for 20 minutes at atmospheric pressure and the cooked meat chunks are separated from the broth. Simultaneously homogenized curd is heated rapidly with vigorous stirring until boiling. Ghee, salt, spices and condiments and the meat broth are added and boiling continued for 20 minutes till a desired consistency is obtained (yakhni). The precooked meat chunks (nate) is added to the yakni and boiled for 30 minutes to obtain nate-yakni. Finally it is sprinkled with dry powder and served hot. Yakni is also consumed with rice. Though it is a very popular product of Kashmir valley, it is becoming popular in the entire northern region especially in Delhi.

At present processing of nate-yakni is considered to be a specialized culinary art restricted to a limited category of people called "Wazas" (experts in processing traditional meat products for feasts). Considering it as their family profession, the wazas are reluctant to share the processing techniques with the common man and they render their services at a high price. A flow diagram of nate-yakni preparation is presented.

Flow diagram for the preparation of nate-yakni



(Samon and Sharma 1988)

Tabak manss : This product is prepared exclusively from the rib portion of lamb / mutton. The rib portion is cut into small pieces, applied with salt and turmeric and moderately cooked by steaming. Bone pieces are removed from the cooked chunks and the meat pieces are shallow fried in desi ghee under low flame for a longer period of time. The final product is semi-dry, crispy and very tasty.

Traditional meat products of Eastern Region

Meat curry is one of the most preferred meat product of the eastern part of the country followed by meat dopiaza, meat fry, biriyani, meat pokora, meat balls in the second line of preference and kabab, korma, kofta and tikka in the third line of preference (Singh *et al* 1995).

Meat curry : For meat curry generally bone-in-meat chunks (chevon or mutton) are preferred. In this region meat curry is prepared adopting two methods.

- (1) Marination followed by shallow frying in oil and then moist cooking.
- (2) Shallow frying of meat along with spices and condiments in oil followed by moist cooking.

In the first method, meat is cut into medium size pieces and marinated with salt, spices, condiments and sour curd for $\frac{1}{2}$ to 1 hour. These are then fried heated oil till all the visible moisture is lost. Then water is added to immerse the meat pieces, the cooking vessel is covered with a lid and cooked on a low flame till the meat is sufficiently done.

In the second method, the spices and condiments are fried in oil and then the washed and drained meat pieces are added to it and fried. After frying the water and salt is added and remaining process is same as previous one.

Mutton dopiyaza : For this preparation, equal quantity of mutton and onion are required. Onions are to be chopped and shallow fried in oil and kept separate. Meat pieces are also shallow fried in oil along with spices, condiments and sour curd and then the vessel covered with lid. After the visible moisture is lost from the meat, sufficient water is poured to the meat and fried onion is layered over the meat. After proper cooking of the meat the remaining fried onion along with garam masala and lemon juice are spread over the cooked meat and kept covered for half an hour. During serving, the spreaded ingredients are mixed thoroughly and generally served with rice or chappati.

Mutton korma : Medium size meat pieces are washed and the water is drained off. It is then marinated with salt, spices, condiments and curd for about four hours. Sufficient quantity of ghee, chopped onion, bay leaves and whole garam masala are fried. Then the marinated meat pieces are added and mixed, covered with lid and cooked under heat till the visible moisture from the meat is lost. Then it is added with curd and little sugar and placed under low flame till meat is completely cooked.

Rapka : It is a prime product of northeastern hill region of India and is made from the meat of mithun and yak. The meat is dried on rapka made of bamboo, hung over the traditional home kitchen flame for several weeks, imparting the name rapka to the product. The meat is semi-dry with special smoke flavor and is very juicy (Rao *et al* 1993).

Meat products of Western Region / Goa

Traditional meat preparation / products of western region especially of Goa are briefly mentioned below.

Meat rolls : It is prepared mainly from pork using muscular cuts like ham and shoulder. Ham is cured overnight and sliced into $\frac{1}{8}$ th inch thickness. A very thin slice of pork fat is placed over the meat slice and spices and condiments and then they are rolled and tied with thread. Rolls are cooked over dry heat / grill till they are soft and tender.

Vindaloo : The meat chunks are pickled / cured in vinegar for one or two days and then it is deep fried in oil.

Shakudi : The meat is prepared by cooking in coconut milk or grated coconut and garam masala (spices).

Meat products of Southern Region

Meat fry, mutton and chicken curry and biriyani are the popular products of southern region of the country. However, a dry salted meat similar to Biltong (dry salted meat) is very popular in parts of Andhra Pradesh and Tamil Nadu.

Dry salted meat : In the preparation of dry salted meat, meats from both small and large ruminants are used. In case of meat from large ruminants, the meat is cut into long strips of about $\frac{1}{2}$ - 1 inch breadth whereas meat from small ruminants is cut into small chunks. These meat chunks are mixed with salt and turmeric powder and sun dried. The dried products have considerable shelf life. Before cooking, these dry salted products are rehydrated and then cooked as usual.

Meat products commonly consumed throughout the country

Besides those mentioned above, there are certain traditional meat products which are commonly consumed in most parts of India irrespective of region. These are meat samosa, meatballs or kofta, kababs, tikka *etc.* Processing and preparation of such products are briefly, discussed.

Meat samosa : Meat samosa is an important Indian cuisine. Samosa can be prepared as a protein based food product using meat of old animal or culled chicken along with vegetable extenders. Raw meat from leg and breast and partially cooked meat from neck, wing and back may be separated and minced through a grinder. Dry spices mixture and green condiments, mashed potato are fried with meat and stuffed into dough made of maida. Deep fat frying is done until the external cover becomes golden yellow and crispy. In addition to mashed potatoes, bengal gram or black gram can also be used as binder.

Meat tikka : Tikka is an indigenous processed product, which is served hot as fast food, usually consumed alone or with tomato ketchup, like fish cutlets. The minced meat, salt, fat, seasonings, binder, green curry stuff, egg and tomato are hand mixed thoroughly and molded into tikkas with the help of a metallic mould. The raw tikkas are fried in vegetable fat till brown color and desirable doneness. Meat tikkas should have a crispy surface and somewhat less springly texture than patties, burgers and other comminuted products. Singh and Bawa (1990) studied the preparation, processing and sensory properties of meat tikkas from culled hens and breeder males.

Meat ball/Kofta : Meatball or kofta are being prepared using coarsely ground meat obtained from old animals or culled chickens. Coarsely minced meat and fat are added with salt, maida, seasonings, condiments and whole egg liquid hand mixed. The coarse emulsion or mix is

molded in to ball shape manually. The meat balls may be cooked in boiling water containing 1% salt and 0.2% polyphosphate (Wani *et al* 1994) or fried in vegetable oil to a desirable doneness (Mandal *et al* 1996; Mandal and Pal 1998). Recipes and processing techniques for kofta have been standardized by Padma *et al* (1988a). The addition of extenders significantly improved the texture, juiciness and overall acceptability. Flavor and overall acceptability scores of goat meatballs could be significantly improved by incorporating different levels of onion, garlic paste (Padma *et al* 1988b). Attempts have also been made to develop low fat meatballs utilizing different binders *viz.* carrageenan, milk co-precipitate *etc* with varying degree of success (Rao *et al* 1994a).

Kabab : There are different varieties of kababs, which are popular in India. Kababs are made either from ground meat or from chunk. Traditionally kababs have been made from red meats. The three popularly available and consumed kababs made from meat are seekh kabab, shami kabab and boti kabab (Rao 1996, Kondaiah 1996). The general ingredients include salt, lime juice, bengal gram paste, egg, garam masala, green chillies, garlic, ginger and cream. The ingredients vary depending upon the kind of kabab. Binders such as wheat flour and whole egg liquid should be added at 3% and 5% levels, respectively. The main steps in the preparation are marination and cooking.

Seekh kabab : Deboned meat / chicken is minced / chopped and made into an emulsion by using salt, condiments and spices. This hand made emulsion (about 4-50 gm) is molded onto the center of a skewer in the form of cylindrical shape and cooked by broiling at 220-230°C to doneness. Seekh kabab gives a blend of meat and smoke flavor.

Shami kabab : Prepared by mixing minced meat with spices, condiments, lentils paste and fried on a giddle using edible oil. Deboned meat is cooked with spices and condiments and then minced. The minced meat is mixed with lentil paste and raw egg is added and thoroughly mixed and formed into round or flat kababs of suitable size and shallow fried in oil.

Boti kababs : Boti kababs are prepared by marinating the deboned chunks with salt, spices and condiments and grilled over an oven / grill / toaster.

Comparative quality of kababs prepared from mutton, spent hen meat and combination of the two was investigated and it was reported that chicken kabab was preferred followed by kabab prepared from the combination of chicken and mutton (Salahuddin *et al* 1988).

Studies have been conducted at CFTRI on the technology of processing of kababs. Marination time, cooking time and the temperature are the critical factors that influence the quality of kabab (Rao 1996).

Meat pickles : Meat pickles are ready-to-eat, highly acceptable convenience meat products of indigenous origin. Pickling of meat by use edible organic acids mainly vinegar and / or edible oil, table salt, sugar, spices and condiments imparts special flavor and shelf stability to the product. Meat pieces of about 3-4 cm³ are pressure-cooked. Cooked chunks are deep fat fried in mustard oil till it develops slight golden brown color and taken out. Green curry stuff (onion, ginger and garlic) and dry spice mix are fried in the same oil and meat broth is added

and heated with constant stirring till boiling. Fried meat chunks are added and boiled for another 2-5 minutes. Finally, acetic acid is added and mixed thoroughly. Then pickle is allowed to cool of its own for packaging. For better keeping quality, heated and cooled mustard oil may be overlaid over the pickle in the bottle / packet. Processing of different types of meat pickles, viz. pork pickle chevon pickle, chicken pickle, gizzard pickle etc have been reported by various workers (Pal and Agnihotri 1994, Pal *et al* 1996, Kondaiah 1996, Rao *et al* 1994b).

Indigenous chicken products

Chicken curry : Chicken curry is one of the major chicken products prepared through out the country with considerable variation in the spice contents (Kondaiah 1996). The basic preparation includes cutting the chicken into cubes of suitable size and marinating with appropriate quantities of salt, turmeric and chill powder and kept for few minutes.

Small quantity of oil is heated and the paste of condiments (onion, garlic and ginger) is fried to light brown color and chicken pieces are added and fried till golden brown and allowed to cook with lid-on or pressure-cooked. The cooking time varies from 10 to 20 minutes depending upon the quality of chicken used. Dry spices powder (consisting of cloves, cinnamon, coriander, cumin, pepper *etc*) is added and stirred and finally suitable quantity of water is added depending upon the gravy desired. A variety of thickness or fillers such as coconut milk, curd, tomatoes, vegetables flour *etc* are added. Dry type of chicken curry is prepared when the chicken pieces are cooked in their own juices or with little water.

Chicken korma : Ingredients and preparation are similar to chicken curry except that curd and grated coconut is added as filler at the final stages and allowed to cook for 2-3 minutes.

Chicken fry : Two types of preparation can be made for chicken fry. Chicken pieces are cooked in water and then spices added and fried in oil to golden brown color. In other preparation raw chicken pieces are marinated and then fried in oil with spices to golden brown color.

Stuffed chicken : Whole ready-to-cook chicken is stuffed with variety of stuffings like fried condiments and vegetables, fried meat mince, boiled eggs, bread crumbs *etc* and roasted in preheated oven or pan with lightly covered lid by turning and applying marinade until the chicken is tender and brown.

Tandoori chicken : Tender broiler chickens are marinated with spices, condiments, lemon juice salt and held for about 3-4 hours. Then the seasoned chickens are cooked in a preheated earthen tandoor at hanging on hooks. Cooking for 15-20 minutes ensures uniform cooking. When cooking is almost completed carcasses are taken out the tandoor and brushed with hydrogenated oil and returned to tandoor to cook for another 2-3 minutes (Rao 1996).

Chicken pickle : Chicken is cut into pieces of suitable size and fried to golden brown color in vegetable fat. Condiments paste is fried in the oil to golden brown color and dry spices are added. The fried chicken is mixed with the spices and cooked. When it is cooled to ambient

temperature vinegar is added and the product is bottled. It is stored at ambient temperature and keeping quality of the pickle is dependent on the degree of the acidity (Kondaiah 1996).

Chicken kababs : The three popularly available kababs made from chicken are seekh kabab (hand,made batter meat is molded on to skewer and broiled). Shami kabab (minced / chopped meat with condiments is mixed with lentil paste and fried) and boti kabab (boneless chicken pieces are applied with spices and condiments paste and grilled or broiled).

Chicken biriyani : Chicken biriyani is a rice based chicken product. Both chicken and rice are cooked separately. Generally, quantity of chicken required is double the quantity of rice used. For this preparation special biriyani rice is available in the market. Chicken is cut into large pieces and these are marinated with spices, condiments, salt, sugar and curd for around two hours. Rice is cooked separately and the gruel is drained off completely. Rice should be cooked to such a level that it remains little hard.

Ghee in a cooking vessel is heated and the chopped onions are fried in this ghee and after frying they are taken out from the ghee. Marinated meat is then put in the ghee in the same vessel and shallow fried till all the visible moisture is lost and meat is taken out of the vessel.

The cooked rice is now mixed with ghee, salt, pepper and whole garam masala. Again the vessel is put over the flame and some amount of ghee is taken and in it bay leaves, cooked rice and cooked meat are arranged layer by layer. In a similar way a total of about 6 alternative layers of bay leaves, rice and meat are arranged. On the top, a layer of fried onion is spreaded; little water is sprayed over the materials in the vessels, vessel is covered with a lid and then the vessel is kept over very low flame.

Mutton / Chicken pulav : This is another very popular rice based meat product having demand all over the country. Chicken pieces are marinated with spices, condiments, salt and curd for half an hour. Marinated meat is shallow fried in oil and after frying it is cooked in its own juice or cooked without any added water. After removal of visible moisture, some more salt and sugar are added and mixed properly and little water is added; vessel is covered with a lid and again cooked for 5 minutes. It is then taken off from the flame. Now salt, sugar, nuts, dried grapes and ghee are mixed properly with rice. Such treated rice is fried in ghee along with bay leaves and afterwards is cooked by adding water. The quantity of water added to rice should be such that by the time the rice cooked no extra water should be left in the vessel. Then the previously cooked chicken pieces and garam masala are added to rice and mixed properly. Vessel is covered with the lid and placed over a very low flame to remove the excess moisture, if any.

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(Reprinted from Proceedings of the National Seminar on Processing of Meat, Poultry and By products for value addition held during 24-26 February 1999, at CFTRI, Mysore.)

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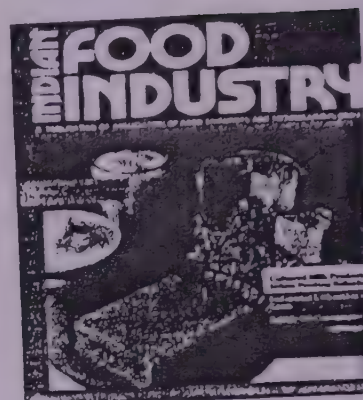
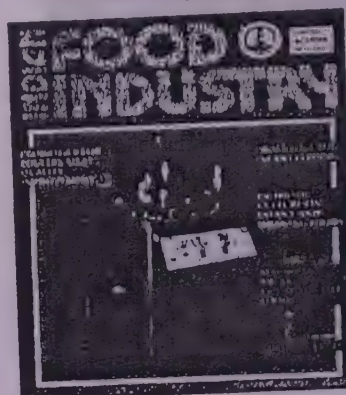
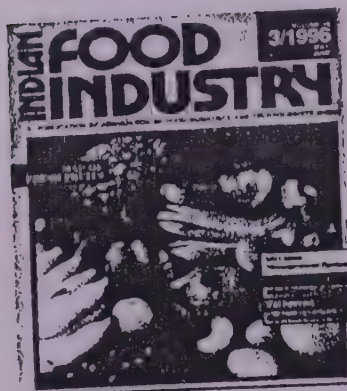
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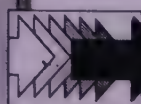
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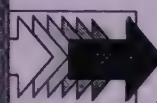
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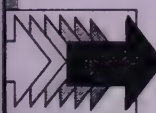
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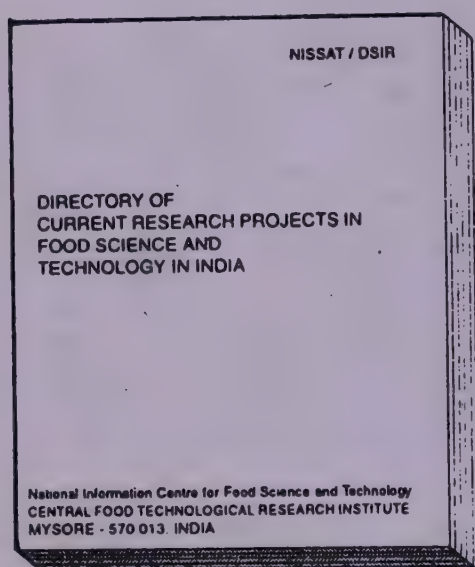
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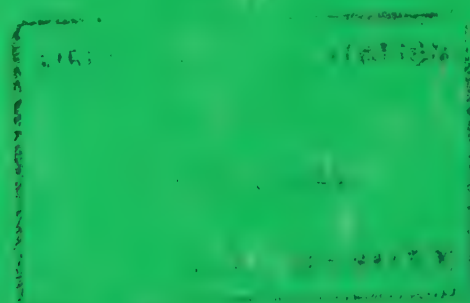
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Printed and Published by Director, Central Food Technological Research Institute,
Mysore – 570 013, at CFTRI Printing Press. Editor: Shri H. Y. Mahakuteshwar
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RAW MATERIALS

214 Scientists working on nutritional value of rice

The Philippines-based International Rice Research Institute (IRRI) will offer "super rice" to farmers for commercial cultivation in 2003. It is trying to improve the nutrition and vitamin content of the ordinary rice grain to fight hunger and malnutrition. IRRI scientists have so far succeeded in raising the iron and zinc content of the grain by about 50%. The plants are being further refined before offering them to farmers. The addition of Vitamin A to the rice grain, however has lent a yellow tinge to the colour of the grain. The acceptability of the new grains by consumers who were used to eating white rice, was yet to be ascertained. This was disclosed by IRRI Director-General Ronald P Cantrell on the occasion of signing of collaborative work plan between the IRRI and the Indian Council of Agricultural Research.

The plan provides for collaboration in various areas of rice research, including hybrid rice, rain-fed rice and rice-based cropping systems. The agreement also envisages exchange of rice germplasm between the world's two major players in rice research. The super rice has been evolved over the past ten years through conventional methods of plant breeding by changing the architecture of the rice plant. The new plant type has shorter stem but longer grain-bearing panicles. The grains constitute nearly 55% of the total plant weight, unlike only 50% in the

best varieties available at present. This variety will be given to farmers for cultivation after incorporating resistance against major plant diseases.

Gurudev Singh Khush, who heads the team of scientists working on the super rice at IRRI, said the new rice would have about 25% higher yield than the present best rice types. Its performance could be improved further by producing its hybrid forms through cross-breeding with other suitable strains. One of India's leading rice scientists, E A Siddiq, said India had become the world's second country, after China, to commercialize cultivation of hybrid rice. At present, nearly 1.5 million hectares are under cultivation of hybrid rice varieties developed indigenously. He said IRRI had identified about 22 varieties from the the basic plan material supplied by India. These were being cultivated widely in several countries. India has developed about 52 paddy varieties from the material obtained from IRRI. *{Business Standard, 16 June 1999, 3}*

215 High-yielding tapioca variety

An early maturing tapioca (cassava) variety, christened 'Sree Vijaya', is developed by scientists at the Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram, Kerala. This high yielding variety, which is highly suited for lowland cultivation as a rotation crop in a paddy based cropping system, is released for commercial cultivation. 'Sree Vijaya' is of erect branching type and produces brown, conical tubers with light yellow

tuber-flesh. The cooking quality of the tuber has been found to be excellent. It has good consumer preference and is therefore assured of a ready market with premium price. Tapioca is raised by vegetative means. Stem cutting is the planting material. Mature and healthy stems selected from well maintained fields should be selected for planting. Stem cutting of 2-3 cm thickness is considered ideal for the purpose. A stalk length of 15-20 cm are to be picked and planted at the depth of 5 cm in fields which are thoroughly worked. This short duration, improved variety needs a wider spacing. Cassava is a drought tolerant crop. It comes up well in all types of soil. However, saline, alkaline and ill-drained soils are not suitable for its cultivation. It can be grown on hill slopes (across the slopes to avoid soil erosion) and in low fertility regions.

Cassava is also an important raw material for starch and sago industries and is a component of animal, fish and poultry feeds. It is processed into vermicelli, papads, and other forms. It is an important renewable energy used widely in some countries such as Brazil.

{*Agriculture Today*, 1(6), 1999,51}

216 A potential fruit for the Andamans

A three year study on several selections of Passion fruit (*Passiflora edulis* L), at the Central Agricultural Research Institute (CARI), Port Blair revealed that fruits of Sel. I-yellow type come up well under the island conditions. The vines are fast growing and begin to bear fruits after 12-18 months of planting. The average fruit

weight is 75g and a healthy vine bears about 60-70 fruits/year (4-5kg/vine). The fruit is as big as a tennis ball, about 6.0 cm long and 5.0 cm broad having a good amount of ascorbic acid (26.80 mg/100 g) and carotenoids (308.55 µg/ 100 g). For preparing good quality squash (1 litre), 250 ml juice containing 600 ppm potassium metabisulphite (KMS) has to be mixed with 500g sugar and 250 ml water. For blending, different combinations with other fruit juices can be tried.

{*The Hindu* 27 May 1999, 23}

217 Genetically modified yeast developed

Nancy Ho of Purdue University, West Lafayette, Indiana, USA has developed a genetically modified yeast which can efficiently ferment cellulose to ethanol. The breakthrough will drastically reduce the production cost of ethanol from renewable feedstocks. This modified organism is the result of almost two decades of work of Ho. Amoco has licensed the yeast strain and Swam Biomass, a joint venture with Stone and Webster, is testing the yeast in a large-scale facility at the National Energy Laboratory in Golden, Colorado. The results have confirmed that the yeast is effective at co-fermenting glucose and xylose from cellulosic biomass into ethanol. The genetically engineered yeast produces atleast 30% more ethanol from a given amount of plant material than the unmodified version of the yeast. It is also highly stable and does not need any special nutrients – or conditions during fermentation.

{*European Chemical News*, 69(1829), 1998, 66}

STORAGE AND INFESTATION CONTROL

218 Whey protein films help improve quality of hot dogs

Coating beef frankfurters with edible film systems based on whey protein concentrate (WPC) was the study conducted by the Northeast Dairy Foods Research Center at the University of Vermont. Researchers found that a film made from polymerized whey protein, can help the meat retain moisture during heating, has little effect on the perceived texture of the product, and can be consumed with the product. In addition, when the film systems were integrated with antimicrobial agents, they effectively inhibited the growth of pathogenic and spoilage microorganisms, including *Listeria monocytogenes*.

According to the researchers, the samples were dipped into a WPC solution containing a mix of acetic, lactic and sorbic acids, dried under forced air, and then vacuum packed in plastic bags and stored at 4 and 13 °C along with controls. The products were sampled at days 3, 10, 17, 26, 39 and 60. A highly trained descriptive panel rated the sensory attributes of the frankfurters, including firmness, springiness, juiciness, freshness, and color. Also monitored were pH, moisture content and texture. The study found that the edible coating, with an estimated thickness of 0.07 mm, did not impose any noticeable texture or appearance change on the frankfurters. The coated samples maintained freshness better than the controls during storage, with the best

result achieved at 4 °C. the microbial acid production was significantly reduced by the coatings. The coated products resulted in better moisture retention, and consequently better cook yield (50% more at 4 °C and 17% more at 13°C).

The results of the study suggest that edible coatings based on whey proteins can be applied to hot dogs and other processed meats to enhance quality of the product. Researchers at the California Dairy Foods Research at the University of California at Davis are also working on the development of whey protein-based edible coatings.

{*Food Technology*, 52(1), 1999, 63}

219 Compounds in horseradish may keep food fresher

Agricultural Research Service food technologist Henry Fleming and Oklahoma State University food chemist Brian Shofran proved both horseradish and mustard oil pack a punch against *Listeria*, *E.coli*, *Staphylococcus aureus* and other food pathogens. That's because these condiments contain a pungent chemical with the unsavory name allyl isothiocyanate (AITC). Mustard oil has 93% AITC, but has a milder flavor than horseradish which has 60% AITC.

{*Dairy, Food and Environmental Sanitation* 19(3), 1999, 198}

220 Humidity keeps fruit fresher

Sea-Land, a pioneer in container and reefer-container transport in Argentina has introduced

a technical improvement that is of particular interest to exporters of fresh fruit. Now products in reefer containers can be kept moist in transit to prevent them drying out. A microprocessor monitors the humidity of the air in the container, maintaining it at a constant 75-95%. If necessary, the microprocessor activates a fan which distributes water in micro-droplets, propelling them with the air stream to the goods. Marcos E Hansen, commercial director of Sea-Land Argentina, recommends the "Fresh Mist" service for fresh fruit, vegetables and flowers.

{Fruit World Special issue – Argentina 1999, 64-65}

221 Antifreeze proteins in fish

American scientists have found an antifreeze protein in some arctic fish which plays a role in preventing damage inflicted by extremely cold temperatures. These proteins have many unusual properties and are an important model for understanding how proteins and ice interact. They are also examining how the proteins enable fish to adapt to freezing temperatures by exploring the protein's structure, function and mode of action as well as the molecular mechanisms involved in switching the genes on and off.

{AIS Tech News, 9(2), 1998, 3-4}

222 Refrigerated storage of fruits and vegetables

Commodity	Temp. (in Deg. C)	RH	Storage Life (in weeks)
-----------	-------------------------	----	-------------------------------

Citrus fruits	8-10	90%	3
Lime	8-10	85-90 %	7
Guava	8-10	85-90 %	3
Mango	13	85-90 %	4
Banana	13	85 %	4
Pineapple	13	85 %	3
Beans	6-8	85 %	2
Carrot	1-2	85 %	3
Onion	1	65 %	3
Potato	2-4	85 %	3-4
Brinjal	10-13	85 %	3
Beetroot	0-1	85 %	7

{Kaigarika Varthe, Jan 1999, 11}

223 Today's milk lasts another five days

New technology, now being adopted by many of the company's leading dairies, has the advantage of extending the shelf-life of milk by upto five days, without changing the taste or texture. Pasteurisation has been used to produce a widely acceptable product but to extend the shelf-life further has, till now, required the use of a higher temperature treatment, which does not tend to change the taste of the milk.

A new system, pioneered by Westfalia Separator, has achieved a significant improvement in shelf-life without the use of additional high temperature treatment and without

changing the taste. It has already been adopted by three of the major dairies. The process involves passing milk through a centrifugal separator operating a very high speed, in addition to the normal pasteurisation process. The centrifugal forces involved are such that the bacteria themselves are 'spun out' of the milk before it leaves the dairy. This means there are fewer bacteria in the milk and it will last longer under domestic refrigeration. There is also less opportunity for variation in the quality of the milk, as the product leaving the dairy is constant, even if the bacterial count was variable when the milk entered the system.

{Food Trade Review, 69(2), 1999, 86}

FOOD ADDITIVES

224 Whip dried range

Molda of Germany, a specialist in food drying, produces spray dried whipping emulsifiers under its Tort-O-Ram range. Tort-O-Ram products are free flowing white powders, easily soluble and freeze staw stable. They are suitable in foamy, whippable desserts where the product creates a spongy structure and adds to a pleasant mouthfeel. Also available is Torta 97 which is suitable for use in production of high quality baking products produced in an-all-one process. It offers high whipping stability and volume.

{Food Ingredients and Analysis International, 21(8), 1999, 37}

225 Nutraceutical beverages with honey

The development of two honey-sweetened, nonalcoholic beverages (cranberry juice-based and lemon juice-based) combining botanical extracts such as ginseng or chamolmile was the subject of a research study conducted by the University of Nebraska-Lincoln Food Processing Centre. The study sought to determine the effect of honey on bitterness and acidity in juice beverages over time, on the modification or intensification of desirable flavours in non-alcoholic beverages over time, and on maintaining colour stability over time. The study also described the mechanisms by which honey may affect mouthfeel, flavors, flavor modification or potentiation, clarity, color and microbial stability.

Shelf-life studies revealed very little change in beverage color, pH, percent soluble solids and clarity during six months of storage. The amount of sedimentation increased in both beverages over time. However, the lemon beverage has less sedimentation compared to the cranberry beverage. Both beverages were microbiologically stable during storage. Sensory analysis revealed the lemon and cranberry juice drinks were acceptable for 180 days, with the highest degree of acceptability at 90 days.

{Food Technology, 53(6), 1999, 164}

226 A healthy re-salt

Researchers at the Fujisawa Pharmaceutical Company in Japan claim to have obtained a salt that is both tasty and healthy, by using sodium gluconate, which has little effect on blood pressure, mixed with

sodium and potassium chloride. A panel of 30 people was unable to tell the difference between solutions of the new salt and regular table salt, the inventors claim. They say that their new salt scarcely contributes to age-related high blood pressure, as well as inhibiting the onset of apoplexy – where blood vessels in the brain get blocked.

{Chemistry and Industry, 21 June 1999, 460}

227 Award winning lecithin uses ultrafiltration

A new process removes triglycerides from lecithin, resulting in a dry, easy-to-mix product which has a cleaner flavor and smell, as well as improved solubility. Because of its molecular structure, the ingredient is said to provide superior emulsification properties for use in a variety of products, including baked goods, confections, dairy products, snack foods, margarines, canned foods and instant foods and beverages. In baked goods, for example, the functional product is said to ensure even mixing, facilitate moisture retention and improve dough handling properties. It may also be used to help release of doughs from equipment, improve crumb texture in cakes, reduce shrinkage of pie crusts and doughnuts, help reduce drying and hardening in icings and act as egg yolk sparing agent. The manufacturer recommends a usage level of 0.25-0.8.

In instant foods, the ingredient improves wettability and makes surface particles more hydrophilic. It can be used to instantize beverage powders, soups and gravy mixes. Typical usage levels range from 0.1-

0.8%. The deoiled lecithin also finds application in reduced-fat and fat-free foods, where it allows these products to maintain the characteristics of full-fat versions. Furthermore, because of its high choline content, it may be used as a nutraceutical ingredient and dietary supplement. The ingredient is available in a variety of forms including powdered, granular and fine granular.

For more information contact:
Archer Daniels Midland Co., 4666
Faries Pkwy., Decatur, III, 62526.
{Food Technology, 53(2), 1999, 78}

PROCESSES

228 Cryogenic technique in food processing industry

Liquid nitrogen and carbon dioxide (liquid or solid) are the two cryogenics used for food application. Cryogenic freezing and preservation of seafoods, fruits and vegetables and other food products using liquid nitrogen have the following advantages: reduced bacteriological deterioration; reduced oxidation, enzyme activity and metabolic deterioration, resulting in preservation of nutritional and vitamin contents; better retention of original colour and texture leading to uniform glazing and attractive product which can fetch maximum market value; reduced freezing time; longer shelf life; lower capital outlay, low and easy maintenance than mechanical systems and higher productivity and higher heat transfer coefficient immersion or deep freezers and batch cabinet freezers.

Liquid nitrogen can also be used for peeling of fruits and vegetables. For example, tomatoes when immersed in liquid nitrogen for 5 to 15 seconds and then thawed in warm water will result in loosening of the skin. Skin removed then would be with a tissue loss of about 5-8%. This technique can also be used for peeling of other fruits and vegetables. Liquid nitrogen injection system can be used for both preservation and inerting. In preservation, a drop of liquid nitrogen is injected into a filled can just before sealing. When the nitrogen expands, the can gets pressurized, increasing in strength and stability. In inertings liquid nitrogen is added to an empty container before fillings. The nitrogen which expands to 700 times its original volume, displaces oxygen from the packaging, increasing the shelf-life of the product. This system is useful for the packaging of oxygen sensitive products such as coffee, sauces, olives and cooking oil. The grinding of spice under cryogenic conditions causes less distortion in the natural composition than ambient grinding. In cryogenic grinding, evaporation of liquid nitrogen quickly chills both the spice and the grinder. Fibrous materials become brittle and crisp making size reduction easy. The use of liquid nitrogen usually results in a cubic particle with good product flow. Grinding in the inert atmosphere reduces the risk of fire hazards and dust explosion. Cryogenic grinding is also applicable to a wide variety of food materials viz., cocoa and chocolate, vanilla-sugar, coconut, coffee, tea, dehydrated meats, etc., It has been found that there is a large gain in flavour when vanilla-sugar is fine pulverized. Coconut can be

ground to eliminate objectionable fibres, while improving its aroma and flavour as high fat content gets solidified and fibres become brittle. This offers application in syrups, cakes and confectionery. Ground cocoa and chocolate retain their natural flavour and aroma. Cryogenic coffee appears to have long lasting freshness of particular interest in instant coffee processing.

{*AgroIndia*, 3(4), 1999, 30}

229 Firmer fruits with the FirmFruit™

FirmFruit™ technology is, a result of extensive investment and research into the pre-treatment and processing of fruit. FirmFruit™ enhances fruit firmness enzymatically with a pectin methyl esterase system. It delivers enhanced texture and identity to fruit preparations, makes fruits firmer, gives minimal fruit fragmentation and as a result, enhances the overall perception of the quality and quantity of fruit. The pectin methylesterase preparation is obtained from a selected GRAS strain of *Aspergillus niger*. The product is preservative-free and bears the kosher status, as well as the kosher Passover status upon request. Applications include dairy products, chilled desserts, ice cream, frozen desserts, bakery and fruit compotes.

{*Asia Pacific Food Industry*, 11(3), 1999, 52}

230 New technology to make coconut vinegar

The Coconut Development Board (CDB) in collaboration with the Central Food Technological Research Institute (CFTRI), Mysore, has

developed a technology for the production of coconut vinegar from matured coconut water using vinegar generators. According to CDB sources here, the vinegar generator assembly comprises a feed vat, and acetifier and a receiving vat for the collection of vinegar. Given the ever-increasing demand for natural vinegar, this would have tremendous potential in the export market. Vinegar has extensive use as a preservative in the pickle industry and flavouring agent in food processing sector.

The matured coconut water comprising 3% sugar content is concentrated to 10% level by fortifying with sugar. The fortified coconut water is then fermented by inoculating the solution with yeast, *Saccharomyces cerevisiae*. After alcoholic fermentation for about 3 to 5 days, the clear liquid is siphoned off and inoculated with mother vinegar containing acetobacter bacteria. The alcoholic ferment obtained is then fed into a vinegar generator where the feed is uniformly sprayed over the surface of the porous packing medium (corn cobs) where the alcoholic ferment is oxidised to acetic acid. The product is run out from the packing medium by gravity flow into the receiving vat from where it is recycled into the vinegar generator and the process of acetification is repeated until a strength of 4% is attained. This acetified vinegar is then aged before bottling. They said a unit with a production capacity of 100 litres per day could be set up on 25 cents of land and the total project cost would come to only Rs. 3.20 lakhs. From 100 litres of coconut water 100 litres of coconut vinegar could be produced daily. An annual turnover of Rs. 4 lakhs could

be achieved while the annual return on investment would be 20%.

{*Business Line*, 18 June 1999, 13}

231 Application of selected unit processes for commercial production of *Burfi*

Recently, a study was conducted by Dr. Champak Palit and Dr. Dharam Pal, to explore the feasibility of using selected unit processes for commercial production of *burfi*. Attempts were also made to enhance its shelf-life. Standardized buffalo milk (SNF: fat = 1.5:1) was used for continuous manufacturing of *khoa*, in thin-film scraped surface heat-exchanger. The *khoa* was blended with sugar in Stephan processing unit to produce *burfi* of desirable quality. *Burfi* was hot filled in pre-sterilized polystyrene tubs of 250g capacity and subsequently vacuum packaged in multi-layer co-extruded nylon barrier pouches and stored at 30° C. The product was examined for sensory, chemical, rheological, microbiological quality at 10 days interval.

The shelf-life of *burfi* packaged in pre-sterilized polystyrene tubs was observed to be 16 days at 30° C, which increased to 18-days and 22-days, by addition of cardamom and potassium sorbate (both @ 0.1% of *khoa*), respectively. All the samples without vacuum packaging got spoiled due to surface mould growth. Vacuum packaging of the polystyrene tubs was found quite beneficial in improving the shelf-life of this popular product. Incorporation of cardamom and potassium sorbate separately in the product coupled with vacuum packaging improved the shelf-life of *burfi* upto a period of 52 days and 60

days, respectively at 30° C. the scope for further improvement in the texture of *birfi* by adopting a unit with slow speed of agitation and scraping still exists.

{*Indian Dairyman*, 51(2), 1999, 65}

BYPRODUCTS AND WASTE UTILIZATION

232 Tulsi, neem and turmeric as mosquito repellents

Extracts of tulsi, neem and turmeric can kill mosquito larvae, according to researchers who say they can also be used as repellents against adult mosquitoes. Leaf extracts of the plants *Leucas aspera* and *Ocimum sanctum* or "tulsi" have been found to be highly toxic to mosquito larvae and have a deterrent effect against the adult mosquito *Anopheles stephensi* which spreads malaria. Further, the "tulsi" extracts are easy-to-handle, inexpensive and safe natural products for mosquito control.

{*PTI Science Service*, 18(7), 1999, 6}

233 Fuel from banana leaf

Banana leaves can now be converted into an energy-rich fuel. Researchers at the Centre of Biochemical Technology (CBT), New Delhi, have devised two methods for this. The first, termed pelletisation, involves crushing the leaves into powder and adding a binder like clay or cowdung to it, and converting it into pellets. In the second method called biomethanation, leaves are digested in the presence of methane producing bacteria that helps in biodegradation. The reaction, lasting 60 days,

produces gases that contain nearly 55% methane. Banana leaves are a renewable source of energy. Thus, effluents from reactions can again be processed to produce fuel with the same calorific value.

{*Indian Journal of Nutrition and Dietetics*, 36(1), 1999, 31}

234 Multipurpose water hyacinth

Water hyacinth has a lot of potential non-food uses which can be effectively used in the following ways: Water hyacinth (dry matter) contains 22% hemicellulose, 31% cellulose and 7% lignin, pulp made from it (mixed with waste paper or jute pulp and appropriate binding and filling materials) can be used for making paper and fibre boards. The bituminous boards can be used as roofing materials or partition walls. Water hyacinth can be shredded lengthwise, sun dried and made into ropes. The finished rope can be treated with sodium metabisulphate to avoid rotting. Water hyacinth is dried and used for making baskets and mattings. The quality of product depends mainly on the proper drying of raw materials. Charcoal dust produced by pyrolysis of Water hyacinth can be made into briquettes with proper binding material and can be used as an efficient fuel. The calorific value of briquettes made with Water hyacinth alone is 3000 kcal/kg. Turbidity and organic matter content of drinking water can be reduced by pre-treating with water hyacinth. Water hyacinth can also be used to remove heavy metals, organic compounds and pathogens from highly polluted waste water. Dried root of

this weed plant is used as a bioabsorbent in removing dyes from aqueous solution.

Water hyacinth improves the soil fertility when used as a mulch and compost. The toxicity of water hyacinth leaves and flowers helps in controlling the stunt nematode (*Tylenchorhynchus brassicae*). Biological value of water hyacinth protein is as high as that of potatoes or cloves. Nearly 75-90% of available protein can be extracted by proven methods. Water hyacinth is sun dried, chopped (2 cm pieces), soaked in water (30 min) and shade dried (65-75% moisture content). The resulting material is favourable to be used as a bed for mushroom production since it has a C:N ratio of 24:3 and a low lignin content of 9%. Biogas produced by mixing water hyacinth powder (dried at 60° C; 50 mesh size) with cowdung contains 67-70% methane. Its practical applications and economics are yet to be determined but the effluent was found to contain low COD and BOD levels. Water hyacinth when chopped and boiled with nutrients can be used as animal feed. When vegetable waste, rice bran, copra cake and salt are mixed, it can be used as piggery feed and when fish meal and copra meal are mixed, it can be used as a feed for pond fish. {*Agro India*, 3(5), 1999,11}

PROCESSED PRODUCTS

235 Nutritious foods developed by CFTRI

The following three nutritional foods have been developed by CFTRI:

Nutrocrispo (Sweet) is made from nutritious ingredients such as defatted soyabean flour, corn grits, corn starch and honey. Every hundred grammes of *Nutrocrispo (Sweet)* supplies 400 Kcal of energy and 15g of protein in addition to adequate quantity of vitamins and minerals essential for efficient functioning of the body.

Nutrocrispo (Spicy) is a spicy, crunchy and delicious snack made from easily available ingredients such as soyabean flour, corn grits and corn starch. *Suruchi-Meetha* is a burfi-like sweet made from traditionally popular wheat flour, soya flour, groundnuts and jaggery. Every hundred grammes of *Suruchi-Meetha* supplies 450 kcal of energy and 15g of protein.

{*CSIR News*, 48(23), 1998, 353}

236 Ready-to-eat canned rice

Piriya Thai Food Co., Ltd, has developed a ready-to-eat canned rice product. Ten years of research was invested into developing this product. The Thai Hom Mali white rice made of scented, long and slender Jasmine grains is cooked to a soft texture with all its natural aroma sealed in. No additives are used. For those who prefer a high dietary fibre diet, they can opt for the brown rice which also contains vitamin B. Cooking of the products is not required. However, for consumers who prefer serving a plate of hot rice, the product can be placed into hot water for a mere three minutes. Otherwise, the product can first be emptied into a microwaveable container and then be placed in the micro-oven for 1 to 2 minutes. Both types of products, which have a two-year shelf life each, are available in two sizes, 435-gram or 180-gram. 1

carton of the product, containing 24 cans of rice, cost about US\$ 18.

{*Asia Pacific Food Industry, Jan/Feb 1999, 73*}

237 Coconut concentrate offers functional benefits

Baker's Coconut Concentrate is dehydrated coconut refined to a very fine particle size (less than 20 microns), yet it still maintains the original coconut flavor and functionality. It can be used in savory application to produce authentic-tasting tropical cuisine or sweet products that are rich in taste. In ethnic sauces or dishes, the coconut concentrate rounds out the taste without providing an overpowering coconut flavor. Its fat content enhances individual flavour, making the taste more multi-dimensional. The fibre content aids the functionality of the dish and helps improve the flavor impact. The small particle size imparts a smooth, non-gritty quality that makes it a superior choice in beverage and sauce applications. It adds unique flavor to a variety of applications from smoothies and fruit drinks to salad dressings, soups and ice creams. Smoothie distributors find that the concentrate adds a richness and intensity to flavor without adding the typical coconut mouthfeel.

{*Prepared Foods, 168(3), 1999, 90*}

238 United biscuits to enter India

United Biscuits, a major British multinational food company and one of the world's top three biscuit manufacturers is entering the Indian biscuit market by launching McVittie's

brand of biscuits shortly. The company has chosen four biggest selling biscuits, out of its stable of 380 varieties, to introduce in India. The product range to be initiated into the Indian market includes Digestive, Hob-nobs, BN pocket and Ginger Snaps. United Biscuits has selected four different importers from Delhi, Calcutta, Chennai and Mumbai. The biscuits will be available in around 12,000 retail outlets in Delhi, Mumbai, Calcutta, Chennai, Bangalore and Hyderabad to begin with.

{*Economic Times, 6 March 1999, 9*}

239 Karnataka Milk Federation launches 'Goodlife'

Karnataka Milk Federation is launching a new brand of milk called Goodlife. This milk, in a polyethylene pouch, can be stored upto 45 days and will not require boiling. It comes ready for consumption and will be available at all supermarkets. Goodlife will make it easy to stock milk. The new brand produced at their new Ultra High Temperature Treatment plant at Kolar promises to bring in world standards to India. The new plant employs a technology that 'flash boils' milk – the milk is heated to 137⁰ C for 3-4 seconds before cooling and packaging. The standard of the milk is high as the flash boiling process kills all bacteria and renders the milk sterile. The process happens in an aseptic environment that offers no chance of post-sterilization contamination.

The Ultra High Temperature technology involves packaging the milk in a pouch that seals in the freshness. The milk is mechanically

poured into the fibre pillow pouch and the pouch is sealed at the required level in a way which has milk filling the pouch from end to end with no air inside. The pouch is made from polyethylene and consists of six layers. The inner layer is milk grade polyethylene and has a layer of aluminium and paper board between layers of polyethylene. This packaging requires high quality milk with a very low bacteria level in it. The plant is being set up in Kolar as the milk produced in Kolar is of the highest standard in the state. Kolar has 90% of Holstein and Fresein bred cows that yield high quality milk and the packaging is tamper proof.

{Economic Times, 26 January 1999, 8}

240 Fortified human milk for premature infants

Infants who are premature may benefit more from fortified human milk than from specially designed formula, Texas researchers suggest. Preemies fed human milk fortified with nutrients appear to be less likely to develop infections and may have an easier time digesting the milk. 108 infants were fed either fortified human milk or formula designed for preterm infants. While the average gestational age is 40 weeks, the infants in the study were born at about 28 weeks, and weighed just over 1kilogram (or 2.2 pounds) at birth. Although the infants fed fortified human milk were slower to gain weight and grow than formula fed infants, they usually went home from the hospital sooner, most likely because they were less prone to develop blood infections and necrotizing enterocolitis, an inflammation of the intestines that

results in tissue destruction, than were formula fed infants.

While the infants appeared to tolerate either food equally as well, only 16% of those fed human milk needed medication to prevent reflux from the stomach into the esophagus, compared with 39% of formula fed infants. The study findings are "hard scientific evidence that fortified human milk is better than formula and is measurable in things that are clinically relevant for the baby," said study co-author Dr. Rober J. Shulman, of the Baylor college of Medicine in Houston, Texas. "Babies were able to get off intravenous feeding faster, reducing risk of infection, and reducing the cost of hospitalisation." The researcher were more impressed by the reduction in risk of necrotising enterocolitis and sepsis, a blood infection, which both commonly afflict premature babies. These benefits of fortified human milk outweighed the slower growth observed in the study.

{The Hindu, 24 June 1999, 22}

241 Flavoured glucose powder

Glucosdin, a high grade glucose powder enriched with vital nutrients including vitamin D, calcium and phosphorus from DSQ Biotech's Home Products Division is now marketed in 200g and 500g attractive pet jars besides the customary 100g and 500g carton packaging. Glucose orange introduced earlier is now in an attractive 200g pet jar. This year the company has introduced two more flavours – cola and strawberry- both available in 200g and 500g pet jars.

For further information contact: DSQ Biotech Ltd, 15, III

Cross Street, West C.I.T Nagar,
Nandanam, Chennai 600 035.
{*The Hindu*, 31 March 1999, 25}

242 Britannia's Zip Sip milk on market

Britannia Industries Ltd has launched its latest product range, Britannia Zip Sip flavoured milk, says a press release from the company. With this launch, Britannia expects to provide consumers in India with the first nationally distributed brand of flavoured milk. Made from pure cow's milk, Zip sip is available in five flavours – strawberry, pineapple, mango, chocolate and elaichi. Each 200 ml pack of Zip Sip is priced at Rs. 8.50. The product is targeted at teenagers and young adults who perceive the need for a healthy drink which is readily available for consumption.

{*Business Line*, 2 April 1999, 6}

243 Oil replacement with modified starch

A unique speciality starch produced by National Starch & Chemical Ltd, Australia is used as a fat mimetic for liquid food systems. N-LITE™ L starch produces solutions which are oily, bland in flavour and have excellent resistance to gelling. Able to be used across a broad range of process conditions, from high to low acid and shear, N-LITE L provides the texture and mouthfeel expected from vegetable oils. Becoming functional through the application of heat and minimum agitation, this starch is easy to incorporate into food processes. It is used in conjunction with modified starches which give viscosity development, and hence does not add

an extra item to the ingredients declaration on the food label.

Specific application ideas are: low oil or no oil salad dressings, to achieve oiliness without the fat, and resistance to gelling over time; impart a rich, creamy mouthfeel to low fat soups which are in the fresh, frozen or dry mix form; reduction of fat content in white or cheese sauces, whilst maintaining a smooth and creamy texture with excellent body.

Labelled as "modified starch", N-LITE L is ideally suited to the health oriented market who desire low fat but demand a texture similar to the higher fat original.

{*Food Australia*, 51(4), 1999, 127}

244 Del Monte foods spices up naturally flavoured fruit line

Del Monte foods, the branded leader in the canned fruit category, recently expanded its Naturally Flavored Fruit line to include three new flavors. These items continue the company's tradition of quality and innovation, while providing consumers with a variety of choices and a dash of spice in the canned fruit category. Providing consumers with more reasons to buy canned fruit, Del Monte's new naturally flavored fruit varieties include *Cinnamon flavored Pear Halves*, Bartlett pear halves with a hint of cinnamon; *Almond flavored Apricot Halves*, apricot halves with the natural taste of almonds; and *Sweet Chunky Cut Peaches*, California peaches with a touch of cinnamon spice. The existing varieties include *Raspberry Sliced Peaches*, *Ginger Flavored Pear Halves* and *Harvest Spice Sliced Peaches*. The entire line

contains all natural ingredients and is packed in a light, reduced-calorie syrup.

{Food Production Management, November 1998, 10}

245 Iced grape fruit drops

Meiji Milk Product has introduced Meiji Fruit Drop into the Japanese market. The Meiji Fruit Drop is a ball shaped three layered iced confectionery containing 70% grape juice. The product encapsulates the natural taste and flavour of fresh grape. The product is combined with Muscat juice and sherbet within the three layers to give it added taste. A 93ml plastic cup is available.

{Food Ingredients and Analysis, 20(7), 1998, 51}

246 *Madila* – a traditional fermented milk

Botswana Food Laboratory has improved a traditional fermented dairy product. It shows how a simple technical investigation may open opportunities for improving incomes through small scale commercialisation. In Botswana milk is commonly fermented to *Madila*, a very popular traditional product which is consumed by most people. The traditional process is quite long taking between 10 and 15 days. The food Laboratory of the Botswana Technology Centre has investigated *Madila* production with the objective of reducing its preparation time and improving the levels of hygiene and sanitation. Fresh milk was heated to 70° C and when cool enough to handle, was filtered through cheese cloth. All utensils were placed in boiling water and then stored in a bucket full of

water to which a few drops of bleach has been added until required. When the milk had cooled to about 30 ° C a small amount of commercial *Madila* was added as a starter culture. The mixture was then kept in a warm place at 40-45° C (wrapped in blankets if necessary to retain the heat). Fermentation was allowed to continue for four days, adding more cooled pasteurised milk each day as in the traditional method. On the fifth day the *Madila* was strained through a clean jute bag after which cold pasteurised milk was added until it had the correct acid taste (pH between 3 and 4).

Taste tests showed the final product to be comparable with traditional *Madila* and we believe that this improved method can be adapted for use in rural areas. The main advantages of the improved method are: it is more hygienic; the product is safer to consume; the yield of final product is greater and the preparation time is halved.

{Intermediate Technology Food Chain, 23 July 1998, 6}

247 *Kanji* – a traditional carrot drink

Dr. Berry of the Central Food Technological Research Institute (CFTRI), Ludhiana describes an unusual traditional fermented carrot beverage which he considered has potential for production by small enterprises. In Northern India, carrots, especially a variety that is deep purple in colour, are fermented to make a traditional ready to serve drink known as *Kanji*. It is very popular and considered to have cooling and soothing properties and to be of

high nutritional value. After thorough washing the carrots are finely grated. Each kilogram of grated carrot is mixed with 7 litres of water, 200g of salt, 40g of crushed mustard seed and 8g of hot chilli powder. The mixture is then placed in a glazed earthenware vessel which is almost entirely sealed, leaving only a tiny hole for gases released during fermentation to escape. The mixture is then allowed to ferment for 7-10 days. The type of fermentation that takes place is known as lactic fermentation which must be carried out in the absence of air. Lactic acid bacteria produce lactic acid which reduces the pH (ie increased the acidity) to a level that prevents the growth of food poisoning organisms. The final product is slightly acidic in taste and has an attractive purple-red colour. After fermentation the drink is strained through fine muslin and has to be consumed within 3 or 4 days after which it goes bad. Each kilogram of grated carrot yields just over 7 litres of *kanji*. Analysis of *kanji* indicates: pH 3.15; acidity % 0.43; brix 4.50; salt % 2.50; total sugars % 1.94; reducing sugars % 1.10; minerals as ash % 0.40.

Kanji could be preserved for 6 months with no loss of colour, aroma and taste by addition of 0.03% sodium benzoate and 0.01% sulphur dioxide (approx. 0.2% potassium metabisulphite). Pasteurisation was considered as an alternative option. The juice was heated to 85° C and hot filled into glass bottles. These were capped with crown caps and heat processed in boiling water for 25 minutes after which they were allowed to cool. Storage tests at elevated temperatures (40° C) showed no

change in colour, flavour or taste after 6 months.

{*Intermediate Technology Food Chain*, 23 July 1998, 5}

248 Fortified tortilla

Mexico has launched a national programme to enrich its staple food – Tortilla – with vitamins and minerals called ‘Micronutrients’ to help its children grow up healthier. The addition of micronutrients to the corn flour that is consumed by nearly all Mexicans is expected to greatly help the country’s nutrition. The officials from the country’s tortilla and bread industries have agreed to add iron, zinc and B-complex vitamins such as thiamine, riboflavin, niacin and folic acid to corn and wheat flour and still not raise the prices of the finished products. Mexicans eat an estimated 4-6 tortillas a day in different forms and the above move does not require a major change in the dietary habit of the people.

{*AIS Tech News*, 9(2), 1998, 3-4}

249 Potato chips

MTR, the Karnataka-based packaging food company is coming out with five different varieties of potato chips taking on such well-placed brands as Uncle chips and Pepsi Co’s Ruffles Lays. To be marked under the brand chip Chat, a 40 gm packet is being priced at Rs. 10. MTR’s potato chip project has an investment of Rs. 1.5 crores, and the installed machinery has a capacity of making 100 kg per hour. The basic ingredient for this product – potatoes – are being acquired from the Indore market.

{*Agro India*, 3(4), 1999, 28}

250 Tortilla baked chips

Baked not fried, this is what makes Guiltless Gourmet tortilla chips blameless where sinful indulgence in fatty and sweet snacks is concerned. On top of its baked concept, the products are also made of healthy ingredients such as stone ground organic corn products, expeller pressed high oleic canola oil and lime. The tortilla chips come in several unique flavours – blue corn, red corn, white corn and even black beans, apart from the usual yellow corn. Available in small or family packs, each serving of about 19 pieces of chips provides 2g of fat, 140 mg of sodium, zero sugar and cholesterol, 3g of protein and a small amount of calcium and iron. A range of Guiltless Gourmet salsa dips is also available.

{Asia Pacific Food Industry, 11(4), 1999, 75}

251 Spices Board launches ginger, nutmeg candies

The Spices Board have launched new products – ginger and nutmeg crystallised candy. Releasing the products, Mr. S. Kannan, Joint Director, said, "The gomger candy is good for sore throat, indigestion and is a mouth refreshener. The nutmeg candy also helps digestion. Both are good for ice-cream topping and fruit cake manufacture.

{Business Line, 16 April 1999, 13}

252 Cholesterol free cooking oil from cotton

A new product is now available at the newly opened *The Cotton Store* in Sydney's Darling Harbour. This is

the range of cholesterol free commercial cooking oils and margarines produced by extracting cotton seed oil from crushed cotton seeds.

For further information contact: Catherine Payne, Cotton Australia, email: cottonaus@cottonaustralia.com.au, web: cottonaustralia.com.au.

{Food Australia, 51(4), 1999, 155}

253 Home Meal Replacement in the UK

Home meal replacement (HMR) and convenience in the U.K don't always add up to the pre-cooked meals that can be microwaved in a few minutes. DIY (do-it-yourself) meals involve more consumer involvement, yet avoid the trouble of purchasing and preparing all the separate ingredients from the scratch. U.K supermarket retailer Asda has launched Meals Made Easy, a range of 20 large-portion DIY meals that include all components (including fresh ingredients) needed for a complete meal. Each dish can be oven cooked, fried or grilled in 20 minutes or less. The line includes cheese-stuffed chicken breasts wrapped in bacon and lamb steaks with olive oil and rosemary. Rival supermarket group Safeway is adding convenience to cooking joints of meat. Its new poultry, lamb, pork and gammon Easy Joints are packaged in oven ready containers that can be straight from the refrigerator to the oven.

{Prepared Foods, 167(11), 1999, 12}

EQUIPMENT AND MACHINERY

254 Peekay launches grain dryer

Peekay Farm Equipments Pvt Ltd (PFEL), a Delhi-based agricultural and post-harvest machinery company, has launched a fully-automatic grain dryer in India, which it claims will "make traditional drying method of grains redundant and end farmers' woes in case of unseasonal rains." The 'Peekay Suncue Grain Dryer', which is a product of the Taiwanese post-harvest equipment company, Suncue Co Ltd. is a user-friendly dryer that has a single one-touch operating button and a fully automatic multiple monitoring system. Priced between Rs. 6 lakhs and Rs. 22 lakhs, the capacity of the dryer varies from 6 tonnes to 30 tonnes. For drying more than 30 tonnes of grains, the dryers can be integrated with each other.

{*Business Line*, 31 May 1999, 8}

255 Dry peeler for potatoes

The solution to the multitude of problems with potatoes and root crops in terms of water usage and treatment is Kusel's Patented RC Waterless or Dry Peeler/ Scrubber. This machine, by means of high speed rotation and the use of brushes, gently brushes the surface of the vegetable and removes the peel without water. The high speed rotation keeps the brushes clean by centrifugal force and the peel settles into a collection pan for removal. This unique approach to solving the problem inherent to peelers not only eliminates the water but also substantially decreases the peel loss associated with the process.

The RC Waterless Scrubber actually improves the appearance of the peeled product and reduces the peel loss as the brushing follows the contour of the product. Kusel's RC Waterless Scrubber can be applied to virtually all applications from true "dry peeling" to brushing after a steam peeler with extremely positive results. While the requirements of each industry and the raw products utilized will vary, the end result is the elimination of the water required in the peeling process and a substantial improvement in yield due to the reduction of the peel loss in the process.

{*Food Production Management*, 121(9), 1999, 10}

255 A nose for fresh fruits and vegetables

Engineers at the University of Warwick have devised an "Electronic Nose" that will help both the vegetable and fruit industry, and ordinary shoppers, solve that perennial problem of how to consistently determine the ripeness of the stuff that housewives shop almost daily. Most traditional methods that have been used to assess fruit ripeness have required the testing to destruction of a piece of fruit. However, University of Warwick Researchers Prof. Julian Gardner and Dr. Evor Hines, (along with Spanish researcher Dr. Eduardo Llobet) have put together the sensors of an electronic nose coupled to a "Fuzzy ARTMAP" type neural network to produce a device that can calculate the exact ripeness of the fruit by its smell. Once the electronic nose has been 'trained' on a particular fruit it does not require a skilled operator and can obtain the results in a few seconds with over 92% accuracy. Said Dr.

Hines: "Our work in this area has concentrated on the ripeness of bananas and apples but the technology can be easily applied to most other fruits. Previously we have used it to test the quality of coffee, beer and wine."

{*Science Express*, 6 July 1999, 1}

256 Picking on the pickle industry

For the first time in the country Indian Institute of Horticultural Research (IIHR), Bangalore fabricated raw mango slicer and raw mango cube cutter for the benefit of pickle industry. The raw mango slicer cuts the fruit into 4-8 uniform slices depending upon required size of the end product. Similarly, the raw mango cube cutter cuts the slices into pickle cubes of required size (10 each). The capacity of both the machines is 600 kg per hour and 1000 kg per hour, respectively. It is expected that both these machines would revolutionise the pickle industry and will reduce the labour requirement by one tenth and cost of operation by one fifth, thus bringing down the cost of pickle on one hand and accelerating its production on the other.

{*Kaigarika Varthe*, January 1999, 15}

257 Clever cooker

Microwave oven that knows how to cook convenience foods could also warn people with allergies that their dinner may contain potentially dangerous ingredients such as peanuts. Many microwave ovens are hard to operate, as their front panels often contain confusing arrays of badly labelled buttons. With trials

due to start in six months, the Intelligent Microwave Oven aims to end that problem-at least for convenience foods. A bar code will contain information telling the oven how to cook the food, explains Kit Yam, who developed the system at the Department of Food Science at Rutgers University in New Brunswick, New Jersey. The work is funded by Samsung, the Korean consumer electronics company. Yam says the microwave ensures that the food is cooked as the maker intended, at the right temperature for the right amount of time-crucial for killing dangerous bacteria in cook-chill meals.

In the kitchen, says Yam, you can customise the microwave to suit your tastes. With the cooperation of the food industry, says, Yam, it may even be able to tell if a food contains genetically modified ingredients. Williams Cookson, an allergy specialist at the John Radcliffe Hospital in Oxford, says that most people with life-threatening food allergies train themselves to scrutinise labels. "There are things in food that people would need to know about and for that reason this might be helpful," he says. The trick has been putting together proven technologies and getting the food industry to make the bar codes more detailed.

{*New Scientist*, 5 June 1999, 16}

259 Chill the milk at source

To avoid the dangers of bacterial growth and lipolysis, milk is chilled at source. ISF Bulk Milk Chilling Tank operates with fastest cooling of milk to +4° C. It's easy to install and operate; has in built refrigeration/ milk storage and chill

water system; uses low power consumption; easy to clean; has automated ice building and chilling systems; has ice bank chill water system which avoids the danger of milk freezing; completely constructed out of prime quality stainless steel; and has insulated tank to preserve the chilled milk at high quality.

For further information contact: Indo Stainless Fabtech (Pvt) Ltd, 48, Nungambakkam High Road, Chennai - 600034. Email: isf@ind2vsnl.net.in.

{*Indian Dairyman*, 51(6), 1999, 17}

260 Magnetic refrigerator comes to kitchen

Carl B. Zimm and his colleagues at Astronautics Corporation of America have developed a magnetic refrigerator under a contract with the U.S. Department of Energy's Ames Laboratory. This refrigerator doesn't have an ice cube maker or a vegetable crisper, nor does it have the standard gas-compression cooling system. It has two cylinders of powdered gadolinium- a dense gray, rare-earth metal- and a superconducting magnet. The magnetic refrigeration working at near-room temperature to produce substantial amounts of cooling power- more than 500 watts, three times the power of a large house-hold refrigerator. It relies on the magnetocaloric effect, the ability of ferromagnetic materials to heat up in the presence of a magnetic field and cool down when the field is removed. When a ferromagnet such as gadolinium, is placed in a magnetic field, the magnetic moments of its atoms become aligned, making the material more ordered. But the

amount of entropy in the magnet must be conserved so the atoms vibrate more rapidly, raising the material temperature. Conversely, when the gadolinium is taken out of field, the material cools.

Refrigeration systems taking advantage of this effect have been used to cool rare-earth oxides to several thousandths of a degree above absolute zero but commercial applications have been stymied by the fact that the magnetocaloric effect is relatively weak in most ferromagnetic materials at room temperature. Gadolinium is an exception, each atom of it has seven unpaired electrons in a intermediate shell, giving the element a strong magnetic moment. The magnetocaloric effect reaches its Curie temperature- the transition point above which a material is no longer ferromagnetic and the point for gadolinium is 20° C. in contrast, the Curie temperature for iron is 770° C. even under ideal conditions, the magnetocaloric effect is not huge. The powerful superconducting magnet in Zimm's refrigerator produces a maximum temperature change of only 14° C in the cylinders of gadolinium. But the machine uses an ingenious regeneration system to increase its cooling power. Water is pumped into one of the cylinders of 4° C immediately after it moves out of the magnetic field. The water cools as it moves through the porous bed of demagnetised gadolinium, then flows through a heat exchanger. Next, the water passes through the cylinder of gadolinium that is inside the magnetic field. The water heats up and flows through another exchanger, providing ample refrigeration power by continually heating one exchanger and

cooling the other. After a present interval, the two cylindr of gadolinium switch places and the flow of water is reversed. Antifreeze can be added to water to allow the machine to cool below 0°C.

Zimm's refrigerator is remarkable efficient because very little energy is lost during the magnetic warming and cooling. The experimental prototype has run at 30% of the Carnot limit- the maximum possible efficiency for a refrigerator- which is comparable with the efficiency of most household units. Zimm believes that a large magnetic refrigerator could operate at 70% of the limit, making it competitive with the best industrial-scale refrigerators. Zimm's colleagues have discovered that a class of gadolinium alloys- mixed with silicon and germanium- exhibit an even greater magnetocaloric effect. The biggest obstacle to the development of magnetic refrigerators is the cost of the superconducting magnet. Commercial uses would be limited to large-scale operations, such as supermarket freezers and air conditioning systems for office buildings. But if the magnetocaloric effect can be efficiently enhanced, the device may be able to run efficiently, with the weaker field generated by a permanent magnet. Then the magnetic fridge could well become a standard fixture of the 21st century kitchen.

(Journal of Scientific and Industrial Research, January 1999)

261 Centrifugal pumps

Mapex pumps offers centrifugal pumps, manufactured in India in technical collaboration with

Pumpefirma Mapex, Norway. Mapex pumps are made from SS-318, Alloy-20, cast steel, cast iron, bronze, gun metal, hastelloy-B, hastelloy-C, and other materials. These are available in different models from 0.5 HP to 100 HP and a wide range of models to suit individual requirements. The special features are: unique and simple design; maintenance free; pumps with mechanical shaft seal; self aligning motor mounted pumps; and value for money. The pumps are available in motor mounted or pedestal mounted versions, suitable for most industries. The advantages are simple and sturdy construction, long life service design and maintenance free. For more details write to: Mapex Pumps (India) Pvt Ltd, 305-C, Vikas building, 11 NGN Vaidya Marg (Bank Street) Fort, Mumbai 400001.

(Chemical Products Finder, 17(9), 1999, 89)

262 Twin Screw Food Extruder

Dr. Subodh K. Mukherjee of M/s Basic Technology Pvt Ltd, Calcutta has developed a Twin Screw Food Extruder. The device is used for production of ready to eat snacks. The torque-limiter of this device automatically cuts off the power at the time of jamming. The extruder can be made available in different capacities.

(Invention Intelligence, 34(2), 1999, 63)

263 Cost-effective, aluminium-safe, foam cleaner

Oakite products Inc.'s FiSan-ACF is a liquid, aluminium -safe, chlorinated foam cleaner, specifically formulated to tackle difficult cleaning problems in food and beverage plants. The USDA authorizes FiSan-ACF for

use in federally inspected meat and poultry plants. A well-balanced blend of superior soil removing, high foaming and chlorine release agents, FiSan-ACF performs well as energy saving ambient temperatures. The product can be used in concentrations as low as 2% by volume of water, through foam generating equipment, making it an extremely economical cleaner. FiSan-ACF generates rich foam that clings to surfaces such as stainless steel and aluminium processing equipment, walls, floors, overhead piping and other hard to reach areas, cleaning them thoroughly and rendering them odour-free. It is safe enough to be used manually or in a soak application on aluminium pans and parts. FiSan-ACF is ideal for use in meat and fish packaging plants, canneries, dairies, soft drink plants, breweries, wineries, bakeries, and other food and beverage processing facilities.

For further information
contact: Oakite Products, Inc.,
Berkeley Heights, NJ.
(Dairy, Food and Environmental
Sanitation, 19(7), 1999, 498)

264	Cleaning/ equipment	grading
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Goldin (India) are specialists in grain cleaning and grading equipment. One of their products are *Clean-O-Grader*. This equipment has modern fine cleaner with grading decks, most suited for spice seeds and grains; pre and post aspiration system with collection chamber and cyclone ensures dust free working in the plant; controls of feed facilitates finer grading of products of several varieties and controls of air allows suction of

lighter impurities/ seeds as desired.
For more details contact:
Goldin(India) Equipment Pvt. Ltd, F-
29, BIDC Estate, Gorwa, Vadodara –
390016.

(*Beverage and Food World*, 26(2), 1999, 121)

265 Wine filtration system

Pall has introduced the OenoClear cartridge designed to replace traditional sheet filtration. It is flexible enough to process white wine after red without leaving residues from the changeover. The cartridge, the only product of its type, has achieved European acceptance. Oenoclear cartridges incorporate a polyaramid filter media which ensures complete yeast removal and is robust enough to allow repeated regeneration in situ. Housed in a hygienic fully enclosed unit, it has been designed for long service. A simple cleaning regime allows processing of white and red wine through the same filters – the clean removes all traces of red wine completely on a red/white changeover. Product losses are minimised by low hold up volume. Filtration can be semi or fully automated which in turn reduces operator dependence. Each system consist of the main filter housing, rinse water filter and steam filter housing, pumps, pipework gauges and valves required all mounted on a stainless steel frame.

For further information
contact: Marketing division, Pall
Pharmalab filtration Pvt. Ltd, Star
Metal compound, L.B.S marg, Vikhroli
(W), Mumbai 400083.
*{Beverage and food World, 26(2), 1999,
115}*

266 Clean filling

Dutch keg manufacturer CurTec and British-based ICE Packaging Systems have developed a new system for liquid packaging. The new concept combines CurTec's 100% HDPE keg as the outer barrier with a newly designed liner as the inner and secondary containment barrier. To ensure that there is no contact with the product during filling or when pouring, a special flange is used. The design of the filling port can be adapted to accommodate different liquid specifications and the liner can be specified to allow such applications as oxygen barriers.

(International Bottler and Packer, 73(3), 1999, 70)

267 Turbo compact filling at 3,600 a minute

Occupying less than 100 sq.ft., the new GEI Turbo Rotafil processing system is designed for plants which require a compact filling system due to space constraints. The system can produce up to 3,600 containers a minute. It can dispense containers, fill with single or multi-station depositors, seal with either plastic or foil membranes and place either a tamp-on or screw-on lid. The finished product is then automatically placed onto a discharge conveyor.

Typical applications include dairy products like yogurt and cream cheese, desserts like trifle and pudding, cheesecake, sauces and many other food and non-food applications. Optional components include check-weighing, metal detecting, date and

price coding plus pressure-sensitive label application.

(Asia Pacific Food Industry, Jan/Feb 1999, 16)

268 Automatic carton filling machine

Tarapore and Associates offers the Autopack-f-2, a continuous motion carton filling machine with variable speed drive system having an output speed of 55-220 carton/min. the automatic carton filling system can handle many types of products like butter, ice-cream, soap cakes, medicine bottles and many other products. For different types of product, the automatic carton filling machine has different types of infeed system which facilitate automatic transfer to the carton filling system. The automatic carton filling system can also have automatic instruction sheet folding unit, rotary instruction sheet feeding unit, rotary batch printing/debossing unit. This unique system does not require any change of parts for size variation of the same type of product, which makes the system very economical for users. The change over time for central size adjustment for carton and product to facilitate change over from one particular size to other can be completed within 60 minutes. This system is available in two models to suit carton sizes of 55%25%20mm (minimum) and 220%70%70mm (maximum).

For more details write to: Tarapore and Associates, 109 Unique House, Chakala road, Andheri(E), Mumbai 400 099.

(Chemical Products Finder, 17 (Annual number), 1999, 163)

269 Bottle washing machine

The Rotary Bottle Washing machine is designed to clean bottles or similar containers by subjecting them to a series of distinctive washing operations. With independent connection for individual washes being provided, the machine is also endowed with a provision for outside wash. The driving mechanism is arranged at the bottom with cone pulley and geared drive to get different speeds. The machine is provided with 4 stations which can be adapted. It is provided with 2 stainless steel tanks of 75 litre capacity. One tank is insulated and provided with 3 KW heater (or steam coil) to maintain the temperature of water and one tank will be provided with float valve. The machine works on the rotary principle and needs manual loading and unloading. It comes in two versatile models that can be easily adapted to suit the requirements of almost any industry.

For further details contact:
Pharmalab Engineering India Ltd,
Star Metal Compound, LBS Marg,
Vikhroli (W), Mumbai 400083.
{*Beverage and Food World*, 26(2),
1999, 129}

270 UV water purifier

Aqua cop UV water purifier has the following special features: triple action purification includes filtration of solid particles, removal of odour, colour and taste and lastly purification by UV waves; uses 254 nm UV waves for killing germs; high frequency electronic technology instantly fires the UV lamp to full power; compact design, which is easy to install and service; all stainless steel body for

durability and hygiene; food grade plastic tubing; regulated flow of water to ensure enough time in UV chamber; can be used even with loft tank supply of water.

For more details contact: Saam D.Mehta, G-1 Amrut villa, 601/B, Dr.Ambedkar Road, Matunga (C.R), Mumbai 400019.
{*Beverage and Food World*, 26(2),
1999, 114}

PACKAGING

271 Revolutionary bottle casing technology from Japan

Asia Hi-Tech Co., Ltd.'s new technology for packing bottles into carton box, is designed to help users cut back on costs and saves on floor space as it requires absolutely no lifting robot to perform pick-and-place operation of bottles into the cartons. After filling, capping and labelling, the row forming (top chain) conveyor drives bottles into a single row. The turntable with bottle driving conveyor (top chain) will then drive the bottles forward to form two, three, or four rows, depending on adjustments. The bottle row forming unit set the number of rows and columns of bottles according to requirement before pushing them towards the caser.

The box magazine can store up to more than 100 pieces of pre-formed carton boxes. Inside the box forming machine, the box is sucked out from the side of the magazine unit in a side way position before vacuum power is used to extend the shape of the box. The bottom side belt cylinders will now fold bottom flaps of the carton

simultaneously, followed by sealing at the carton sealing station and palletising. As the bottle casing is compact in size, minimum installation and space are required. In addition, it liberates workers from hard work and minimises bottles from falling due to human handling. Asia Hi Tec's AS-8600 bottle caser comes in two versions. The ones built outside Japan is targeted at those who want a fabricated Japanese product, renowned for its technology, but at a lower cost, while the other type is assembled solely in Japan.

{Asia Pacific Food Industry, Jan/Feb 1999, 16}

272. Redesigned poly bottle

Positive handling, better pourability and the need for on-pack information were included in the brief from super-markets for the redesign of the 16-year old standard milk polybottle. Plysu was one of a number of manufacturers who took up the challenge. Improvements made by Plysu's in-house design team included increasing the handle area of the 4-pint bottle from 58mm to 75mm to allow for better 'handleability' by the average user. The chimney flange at the top of the neck was also redeveloped to increase pourability and significantly reduce the occurrence of drips. Finally, a measuring scale in pints and litres was moulded on the back to meet the need for additional on pack information. According to the company, its 4-pint and 6-pint bottles came out on top of a major piece of industry research which confirmed the customers' preference for them over other designs.

{International Bottler and Packer, 73(2), 1999, 50}

273 Plastic beer bottle

One unusual package that's generating considerable excitement is the plastic beer bottle, previously dismissed as infeasible. Until recently polyethylene terephthalate (PET) simply couldn't provide the oxygen barrier that beer needs to maintain freshness. With the development of multilayer barrier containers, barrier coatings and barrier closures, plastic beer bottles are now possible. Though there are cost, marketing and environmental hurdles to overcome, no package since the reclosable stand-up pouch has caused this much excitement. Although many brewers worldwide are experimenting with plastic bottles, Miller Brewing Co., Milwaukee, has initiated the most ambitious undertaking. After positive response to smaller tests, Miller introduced 20-oz and 1-liter plastic bottles for Miller Lite, Miller Genuine Draft and Icehouse beers in November in Los Angeles, Phoenix/ Tucson and Norfolk, Va. Like their glass counterparts, Miller Lite and Icehouse bottles are amber, while the Genuine Draft container is clear. Since then, a 16-oz size has joined the group, and markets like Miami, Dallas and San Antonio have been added. Miller claims that its five-layer barrier bottle provides a 120-day shelf life, the same as the beer has in glass bottles or aluminium cans. The key to this four-month shelf life is two oxygen-scavenging layers in the bottle's five-layer structure, one of the first uses of scavenging technology in a rigid container. The PET-based bottle reportedly keeps the beer cold just as well as glass and better than aluminum. It is seven times lighter than glass and nonbreakable, making

it suitable for sale at stadiums and concerts where other containers often are prohibited. The multilayer bottles are much stiffer than PET soft drink containers, a feature beer drinkers say is essential, according to Elliot Young, Chairman of Perception Research Services, Fort Lee, N.J. Bottles are capped with resealable 38mm roll-on aluminium closures with coextruded high-barrier liners.

{*Prepared Foods*, 168(4), 1999, 45-50}

274 IMA's latest teabag machine

The IMA C18 is IMA's latest machine for the production of single chamber filter bags heatsealed on three sides, with thread and tag (maximum production speed upto 150 bags/minute). Two different versions of the IMA C18 are available: one for the wrapping of naked bags in crimped envelopes; the other, in heatsealed outer envelopes. For a variety of packaging solutions, other configurations and are also available; exit slipway for manual removal; exit channel for manual removal; automatic cartoning attachment for pre-glued cartons; etc., the machine also permits easy composition of lines, says the company.

{*Tea and Coffee Trade Journal*, 171(1), 1999, 94}

275 Tender coconut water in pouches

Tender coconut water will soon appear in the market in aluminium cans and pouches in its original taste and flavour. Given the availability of tender coconut in abundance in the country, which was the world's top producer and the potential

marketability, the need for preservation of tender coconut water in natural forms for commercial exploitation had been felt, said a group of scientists of Defence Food Research Laboratory (DFRL), Mysore. But this had to be done in an economically viable method keeping in view the difficulties in large scale procurement, cost of processing and marketing potential at a competitive and remunerative price. They said that a bio-preservative had been successfully investigated for preserving tender coconut water by DFRL scientists. Besides, a process technique for preserving the water in aluminium cans with E.O lids and multi-layer flexible packaging system had been standardised. The product would have a shelf life of six months. Consumer acceptability trials had indicated that the product would be acceptable and be popular, they said. Efforts were also already made for the commercial production and marketing of the product. The technology was so simple that it could be adopted by the small-scale sector in coconut growing areas, they pointed out.

{*Business Line*, 8 May 1999, 8}

276 Resealable packs keep seafood fresh

Printed and unprinted plastic films and bag specialist, Sudpack UK has been working closely with Swedish company, Antonson System AB to develop and market a new system of resealable packaging for fish and seafood products. Reseal-It has been designed to offer seafood processors increased convenience. Sudback claims its benefits are less product wastage, an effective resealable aroma barrier to keep the

contents fresh and improved brand recognition. It is designed for use with conventional packaging equipment. The label was developed by Swedish manufacturer Swedtryck and is made from an adhesive multi-layer film fixed by a pressure sensitive adhesive. {*Food Manufacture*, 74(5), 1999, 62}

277 Kwik bag closure

The all-plastic Kwik Lok bag closure is designed to make it easy for consumers to conveniently reseal bagged packages. A convenient easy-to-use bag closing method maintains the product's freshness on consumer shelves. Packages that are easy to reseal are more frequently resealed. When the package has been opened and the contents partially consumed, Kwik Lok provides the consumer with an easy and convenient reclosable package. Kwik Lok maintains the taste and flavor of bread to the last slice.

For further information contact: Kwik Lok Corporation, Executive Office, P.O. Box 9548, Yakima, WA 98909. Internet: www.kwiklok.com.

{*Milling and Baking News*, 77(48), 1999, 25}

278 Cereal in snack packs

Cereals, a concept conceived to make breakfast easy, simple, healthy and fun, has spun off in a new direction. While consumers have been snacking on the product, it is not until now that an actual snack packaging is promoted in the supermarkets. In metallised film, giant cereal manufacturer Kellogg's has introduced 25-gram pack on the market to drive

consumption as well as expand market share. The products are not only given a more upbeat look with brighter and glossy images as a result of the packaging material, but are also easier to store and discard when compared to cardboard boxes. Each packet of cereals contain 10 different types of vitamins and iron.

{*Asia Pacific Food Industry*, May 1999, 72}

279 Tubular poly foam netting for fruits

A new packaging material i.e. tubular poly foam netting (FOMGARD) for packaging of fruits, vegetables and other horticultural produce and various products has been developed/ manufactured in India by the Supreme Industries Ltd. This new innovative packaging material is under use in some advanced countries, for unit packaging of various fruits viz., apples, pears, persimons, papaya, mangoes, pomegranates, melons and other horticultural produce. Some fruits imported in India by big fruit merchants from Japan, Korea, Russia, New Zealand and other countries are packed in the tubular polyfoam netting. The fruits so nicely packed look very attractive, superior in quality, taste and find ready market. India being the largest producer of fruits and vegetables, their market can be expanded by using such improved packaging material. In one metre fomgard, 20 big sized apples or 10 big mangoes can be packed by cutting the netting tube into required size of pieces or rings. The Fomguard has several unique features and advantages: It is attractive, very light in weight, quite tough and flexible; easy to pack or unpack the

products; has visibility of the packed product, without unwrapping; gives protection of fruit waxing, labels and marks; is anti-abrasion, moisture/water, temperature, fungi and mould; hygienic, non-toxic, odorless and fit for packaging food products; and is economical, less expensive and re-usable. The Fomgard is proving boon to fruit merchants/ horticulturists, exporters & gift packers. A number of organisations like Export Houses, State/Central Agriculture/Horticulture Departments and Institutes, Corporations progressive orchardists, fruit merchants etc., in India are taking keen interest in FOMGARD for better packaging of their products.

For further information contact: Mr.A.K.Malhotra, Dy. General Manager, The Supreme Industries Ltd, 518, Osian Building, 12, Nehru Place, New Delhi 110019.
{*Supreme Industries Ltd Trade Catalogue, 24 May 1999*}

280 Crystalline Polyethylene Terephthalate food container

CPET (Crystalline Polyethylene Terephthalate) is finding application for fresh food packaging in convenient plastic dinner trays with a clear plastic lidding. The newness lies in selling a fresh food product with extended shelf life without freezing. The food and tray are steam pasteurised at 180° F (82° C) then cooled to 35° F (2° C) within minutes. Eastman chemical company's Eastapak is durable enough to withstand the thermal shock. Sealing is done while the tray contents are hot, so a natural vacuum is created as

the food cools. Lawson Mardron Thermaplato, who moulds the trays, say that the barrier properties allow the vacuum to be maintained. The therma tuff trays are moulded in squares of 8 ¼" × 8 ¼", dual ovenable and can withstand temperatures from -40° F (-40° C) to 400° F (205° C).

For further information contact: Eastapac CPET, P.O.Box 431, Eastman chemical company, Kingsport, TN 37662-5371, Email: Kfergusn@eastman.com.
{*Packaging India, 31(6), 1999, 88*}

281 Tear-strip material for easy opening

Tearstrip Systems Inc. which specialises in easy open features for flexible packaging has three interesting packaging products to offer. The dry edge tape Peelwrap, when used with Tearstrip's peel wrap applicator, creates a patented, easy opening feature for shrink wrapped packages. It is applied on-line with the adhesive area centered over a perforation in the film. The package is then wrapped as usual and sent into the shrink tunnel. With no tab hole and a large grip area (perfect for gloved hands), it is most ideal for packaging frozen pizza and convenience store sandwiches. Peelwrap can be used with straight or inverting L-sealers and high-speed shrink equipment or continuous motion wrappers where the tape unit mounts in the film unwind area. The second and third product, Tearstrip a narrow self-wound pressure-sensitive tape for application to overwrap films and Shrink-tape, a shrinkable tape are ideal for boxed candies and OTC pharmaceuticals, respectively.

Tearstrip, unlike wax alternatives, is light in weight and has a full width coating which provides 100% adhesion on all overwrap films.

Whether it is Tearstrip or Shrinktape only light pressure is required to ensure perfect bonding because of their high initial tack adhesive properties. The Tearstrip application equipment is designed for trouble-free dispensing and will function on most quality tape dispensing equipment. The shrink tape applicator, on the other hand is designed to form a tab for easy opening of the package. The applicator employs a brake controlled dancer unwind for smooth roll release. The tab former is air driven and a positionable roller allows for consistent and exact tab placement on the package. *{Asia Pacific Food Industry, 11(3), 1999, 26}*

282 Packaging with heat shrinkable film

Plastic International offers heat Shrink-on-Wrap packaging system to ensure pilfer proof, tamper evident all round packing. The system consists of bags, tubes, labels, sleeves and cap seals made of PVC, heat shrinkable films to label and seal bottles and containers of beverages, cosmetics and a host of consumer products or sets of small items. This system of packaging offers the following advantages: moisture and fungus proof barrier properties, increased shelf-life; prevention of spurious products; scratch resistant labels; prevents damage during transportation; versatility of packing in any shape, contour or format; and

total elimination of existing lamination process. Specifications: cut pieces in Layflat form, size 7.5 mm to 600 mm L/F; shrinkage length 10%-20%, width 40%-50%; thickness 0.025 mm to 0.30 mm. Any other size, shrinkage factor and thickness can be made to customer's requirements. The ideal temperature for fast shrinkage is 100° C - 200° C in 15 seconds for large scale production. Tested method of shrinkage is immersed in boiling water at 100° C for 30 seconds. Manual or fully automatic high speed machines used for this type of packaging are manufactured and supplied.

For further information contact: Plastic International, B/13 Nand Dham Industrial Estate, Marol Maroshi Road, Andheri (E), Mumbai 400059. *{Industrial Products Finder, 27(3), 1998, 85}*

283 Taint-free cork

Amorim has introduced 'Twin Top', a new cork for wines which it says is guaranteed taint-free due to a new decontamination process developed by the company. The process, 'INOS II', works on the principle of hydro-dynamic extraction and is the result of six years' technological research. Twin Top uses the same principle as the champagne cork, combining agglomerated cork with natural cork discs which are in contact with the wine. The agglomerate is formed from the unused cork when natural corks are punched from a piece of bark. Discs of natural cork are fixed to either end so that the cork can be inserted either way up to the bottling line.

{International Bottler & Packer, 72(12), 1998, 48}

284 Tubular polyethylene film to seal bags

Chrono-Bag FFS-TF bagging machines use tubular polyethylene film to form, fill and seal bags in the weight range of 10-50 kg. Using film thickness of 80-250 µm, the machines are available in three models: 600, 900 and 1,200 bags/h. the product to be bagged can be in the form of granules, pellets or, in some cases, powder. Bags can be gusseted or non-gusseted, and the bag forming technique in which the filled bag is compacted and evacuated of air means that no additional corner welds are needed.

For further information contact: Chronos Richardson Ltd, Nottingham, U.K

{Chemical Engineering, February 1999, 761-16}

ANALYSIS

285 Naturally occurring antioxidants and their sources

Antioxidant	Sources
Vitamin C (ascorbic acid)	Fruits and vegetables (e.g berries, citrus fruits, potatoes, green peppers and sprouts)
Vitamin E (tocopherols & tocotrienols)	Grains, nuts, oils, dairy products and vegetables
Carotenoids (e.g beta-Carotene)	Fruits and vegetables (e.g citrus fruits, apricots, cantaloupes, dark

	leafy vegetables, carrots, sweet potatoes, yams, tomatoes), oil palm
Flavonoids derivatives (including catechins)	Fruits and vegetables (e.g berries, citrus fruits, cruciferous vegetables, onions, tomatoes, yams), oilseeds, red wine, tea
Phenolic acids and derivatives	Oilseeds, cereals and grains, fruits and vegetables, herbs and spices (e.g rosemary, sage, marjoram, ginger)

{Indian Food Packer, 53(2), 1999, 32}

286 Lactostar – a milk analyser

Lactostar – A new, versatile, easy-to-operate, microprocessor based, fully automatic milk analyzer for the determination of fat, SNF, protein, lactose and freezing point has been introduced for the first time in India.

For details contact: Benny Impex Private Limited, B-209, Naraina Industrial Area, Phase -1, New Delhi 110028.

{Indian Dairyman, 51(6), 1999, 66}

287 Kit for aflatoxin detection

The aflatoxin detection kit developed at the Central Food Technological Research Institute, Mysore can detect as low as 20 ppb of aflatoxin B1 in samples by a simple method and in a short time. 20 ppb the safe limit set by the FDA. The kit consists of : (a) a glass syringe to deliver measured amount of solvent; (b) mini TLC TANK; (c) mini silica

plates, (d) micropipettes; (e) standard aflatoxin; (f) hand held battery operated UV torch. The toxin is extracted from a 10g sample of foodstuff or feed with acetone and water mixture and further with chloroform. The extracted material is analysed by mini thin layer chromatography. It takes about 5 mins. The aflatoxin spots are visualised by flashing a battery operated UV lamp and estimation of toxin content done by a comparison with the standard.

{*Fragrances and Flavours Association of India (FAFAI), Journal, 1(1), 1999, 73*}

288 Microsensor to detect spoiled foods

A tiny electromechanical machine reported to be capable of detecting spoiled foods - a microsensor "tongue" has been invented, by a couple Vijay and Vasundara Varadan in San Diego. Stuck inside milk cartons and juice bottles some sensors might enable check-out scanners at the grocery market to detect the growth of unwanted bacteria. Others might be placed in giant vats in food and chemical factories to monitor the blending of ingredients. Slightly different versions could be mounted on aircraft wings to alert pilots when ice begins to form. The smart tongues have at least three advantages over traditional chemical sensors. They are small made from silicon, quartz, aluminium and hence can be manufactured cheaply; secondly they are wireless. They receive power and transmit their readings by radio waves or microwaves. They can be placed in milk cartons, flush against helicopter

rotors, inside pipelines. The third one is they can detect chemical changes without performing any chemical reactions. Instead they sense shifts in the viscosity as well as changes in their electrical and acoustic properties by purely electromechanical means.

Varadan's machine makes use of measurement of waves discovered by British geophysicist almost a century back. It contains two pairs of inter-meshed combs sandwiched between a thin layer of SiO_2 and a slab of quartz. When connected to a small antenna which may be as simple as 1 cm spiral of Al foil, each comb will tune in to any radio signal whose wavelength matches the space between its tines. At the right tone (900 MHz) the combs begin to shimmy back and forth and love waves return to the combs where their vibrations are converted back into an electrical signal that radiates out through the antenna.

The chemical measurement happens during the Love waves' round trip through the top layer of silicon. Those exposed to the fluid will be slightly slower and weaker than those that were shielded. The difference shows up in the device's radio transmission, which a scanner compares to a database of normal values. Placing a second sensor just a micron higher on the same chip boosts the sensitivity of the systems remarkably. The inventors say that the same sensors, once calibrated reliably discriminate slightly spoiled fruit juice from fresh-squeezed, ice from water, and tap water from distilled water.

{*Journal of the Scientific and Industrial Research, 58(1), 1999, 51*}

289 Detecting palmolein in coconut oil

A simple method to detect the presence of palmolein in coconut oil has been developed by the Regional Agmark Laboratory (RAL). According to RAL, who have developed the method, about 90 per cent of the fatty acids of coconut oil is saturated. They comprise lauric, myristic and palmitic acids with lauric acid predominating. In palm oil, the saturated and unsaturated fatty acids are almost in the ratio of 1:1. In comparison with leading edible vegetable oils, coconut oil was low in unsaturated and polyunsaturated acids particularly linoleic acid. Coconut oil can be distinguished from other fats and oils, except the lauric acid oils and butter fat, by the low average molecular weight of its fatty acids as shown by a high saponification number and low refractive index. Palm oil exhibits certain characteristic behaviour ascribed to its high content of B-carotene. The palmolein fraction is also supposed to exhibit such characteristics as the carotenoids are not fully removed by the process of bleaching, refining, etc. The method is based on solvent partition technique to separate the unsaturated compounds from the oil sample, followed by the extraction of carotenoid pigments especially B-carotene and finally a colour test. Using this simple method, the presence of palmolein in coconut oil even as low as one per cent could be detected. Sensitivity of the test could be enhanced by increasing the oil sample quantity taken for extraction with the corresponding increase in the quantity of furfural taken.

{*Agro India* 3(5), 1999, 29}

290 Checking for Ciguatoxin in fish

Adgen Ltd tell us they have expanded their toxin detection kit range with the introduction of a simple screening test for determining the presence of Ciguatoxin (CTX) in exotic fish. Ciguatera fish poisoning is a neurological illness caused by eating tropical reef fish, such as snapper and grouper, that have accumulated CTX through the food chain. The actual toxins originate from micro-organisms that grow on the surface of marine algae. Until the release of this Cigua-Check kit, has been extremely difficult to monitor imports of these types of fish. Conventional methods have involved the use of expensive and time-consuming bioassays but with the Cigua-Check, a result can be obtained inside 45 minutes without the use of any specialist knowledge or equipment. In fact, Adgen have also now introduced into the UK the first commercially available test kit to protect consumers from minute quantities of unlabelled eggs in food products. Egg allergies are most prevalent amongst infants and small children, and this egg residue test would seem to be of particular interest to processors of pasta, ice cream and babyfoods. The greatest risk occurs when equipment needs to be shared with other food lines, and this kit may be used as a quick and easy way to make sure all the egg residue has been removed after cleaning.

For further information contact: Adgen, Nellies Gate, Auchincruive, Ayr, UK.

{*Food Trade Review*, 69(3), 1999, 170}

291 Multi-grain moisture meter being developed

A MULTI-grain moisture meter, that gives fast information about the moisture content in grains and would be a handy tool in mandis and for procurement agencies in fixing the prices is under development at the Central Scientific Instruments Organisation (CSIO) here. The Technology Mission on Oilseeds and Pulses & Maize (TMOPM) of the Union Agriculture Ministry was providing funds to the tune of Rs. 19.5 lakhs for the development of the multi-processor-based gadget, which would be ready by early 2001. Dr. Ganju, Head of the Agri-electronics division, said. The gadget would have provision in the form of counters that could help in selectively obtaining the data concerning the moisture content in three to four grain samples placed in these counter in quick succession.

The modern agri-instrument would substitute the nearly 25 year old, widely used low-cost meter also developed by CSIR. It is being marketed by Naina Electronics of Chandigarh. The instrument is based on the capacitance-variation technique. The device has limitations in that it can analyse a single grain. But by suitable calibration a totally different grain can also be analysed, which means extra effort and time. It is also relatively heavy. The moisture content in grains or cereals is one of the key factors in determining the procurement price of grains brought by farmers at mandis and by procurement agencies. It is also important in the storage and processing of food grains. Under

practical storage conditions it is the principal determining factor to maintain their quality.

For instance, the grains which contain too much water attract mold growth, sprouting and insects that cause deterioration. Moisture content of 10.15 percent, depending on the temperature and storage period, is needed to keep the grains in good condition during storage.

{Business Line, 13 May 1999, 13}

292 Bactaslyde for food microbe detection

Several kinds of pathogenic micro-organisms, principally bacteria, can grow vigorously in many moist, warm foods such as milk, meat, egg, fish, etc. This could result in a great health risk. This is avoidable if microbial count of the food stuff could be monitored regularly and thus kept in check. Normally this would be done by conventional time consuming, expensive microbiological methods, requiring trained manpower and a well equipped laboratory. Bactaslyde is available for several types of organisms, viz., Aerobic bacteria, yeasts and fungi, total coliform bacteria, salmonella and pseudomonas. It is useful in monitoring microbial flora of food manufacturing, hotel, catering and dairy industries. Testing could be done at the closing time of a laboratory or even at the opening time, without having to wait for any preparations at all. Similarly raw material suppliers could be monitored conveniently, anytime, anywhere. Bactaslyde is used extensively for testing of water, paints and pigments, soft drinks and ice

cream, beer, wines, spices, jams, squashes, etc.

For details contact: Rakiro Biotech, 27 Sahayog 33/35 RS Sapre marg, Kalbadevi, Mumbai 400002.
{Beverage and Food World, 26(2), 1999, 106}

COMMERCIAL INTELLIGENCE

PRODUCTION (RAW MATERIALS)

293 All-India production of foodgrains

(Million tonnes)

Commodity	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Rice	74.68	72.86	80.30	81.81	76.98	81.31	82.1
Wheat	55.69	57.21	59.84	65.77	62.10	69.27	66.0
Coarse Cereals	25.99	36.59	30.81	29.88	29.03	34.28	31.6
Cereals	156.36	166.66	170.95	177.46	168.11	184.86	179.7
Pulses	12.02	12.82	13.31	14.04	12.31	14.46	13.3
Foodgrains	168.38	179.48	184.26	191.50	180.42	199.32	193.1

{Agricultural Situation in India, 55(5), 1998, 285}

294 Global oilseed output

Oilseed	1997-98	1998-99
Soybean	156.96	158.06
Cottonseed	34.84	32.92
Groundnut	26.75	29.29
Sunflower-seed	23.56	26.31
Rapeseed	33.26	36.88
Copra	5.73	5.18
Palm kernel	5.23	5.51
Total	286.33	294.15

{Business Line, 18 March 1999, 22}

295 Production of raw cashewnuts in India

(in Tonnes)

State	1993-94	1994-95	1995-96	1996-97	1997-98
Kerala	140200	119200	140000	134000	100000
Karnataka	31540	26400	37600	52000	35000
Goa	16210	16960	17800	20000	25000
Maharashtra	46860	37600	69000	80000	60000
Tamil Nadu	19200	22000	30930	30000	30000
Andhra Pradesh	46570	58700	71700	60000	50000
Orissa	43420	37200	43000	40000	45000
West Bengal	3990	3280	6960	6000	6000
Others	360	300	840	8000	9000
Total	348350	321640	417830	430000	360000

*Estimates
(Source: Directorate of Cashew & Cocoa Development, Kochi.)

{Hindu Survey of Indian Agriculture, 1999, 119}

PRODUCTION (INDUSTRIAL)

296 Statewise sugarcane
 production

(Thousand tonnes)

STATES	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Assam	8	8	8	4	7	8	6	4
Andhra Pradesh	701	843	540	647	874	859	772	782
Bihar	415	462	328	230	394	382	362	299
Goa	8	18	13	8	16	19	15	10
Gujarat	831	753	751	826	759	1130	967	890
Haryana	375	489	345	308	343	453	490	382
Kerala	9	9	6	2	12	13	5	6
Karnataka	942	1032	847	831	1225	1263	871	959
Madhya Pradesh	104	128	60	37	70	125	86	68
Maharashtra	4119	4213	3360	2746	5025	5394	3445	3847
Nagaland	4	4	3	1	1	1	-	-
Orissa	23	37	33	24	43	83	78	57
Punjab	275	384	409	311	319	633	613	331
Pondicherry	48	63	45	37	62	57	33	37
Rajasthan	24	37	24	16	18	31	24	29
Tamil Nadu	1183	1264	976	1085	1859	1614	1050	1229
Uttar Pradesh	2975	3654	2857	2715	3609	4379	4083	3922
East U.P.	769	953	787	677	1012	1043	1058	881
West U.P.	1030	1204	878	983	1142	1559	1393	1441
Central U.P.	1176	1497	1192	1055	1455	1777	1632	1600
West Bengal	3	6	4	5	7	7	5	3
All India	12047	13404	10609	9833	14643	16451	12905	12855

{Indian Sugar, 49(1), 1999, 76}

297 Area and production of cocoa

Year	Area (ha)	Production (tonnes)
1983-84	22227	5610
1984-85	22033	6200
1985-86	20948	7715
1986-87	18934	7625
1987-88	18016	7474
1988-89	17594	7392
1989-90	16882	6912
1990-91	16188	6946
1991-92	13965	7376
1992-93	12301	6821
1993-94	11230	6760
1994-95	11230	5713
1995-96	10642	5741

{Hindu Survey of Indian Agriculture, 1999, 99}

EXPORT

298 Indian tea exports to various countries

In mkg

	1998	1997
UK	19.5	26.1
Russia	82.5	89.0
CIS (total)	93.5	95.3
Poland	9.7	10.5
ARE	6.0	4.8
Libya	6.4	1.6
UAE	22.0	21.2
Iraq	10.0	1.3
Germany	4.2	5.7
USA	6.6	5.4

{Financial Express, 24 May 1999, 16}

299 Spices exports

Qty in tonnes; value in Rs. lakhs

Item	April-Jan '98-99	
	Qty	Value
Pepper	26,550	48,100.80
Cardamom(s)	190	1,119.50
Cardamom (l)	1,050	863.00
Chilli	28,750	10,965.00
Ginger	9,000	3,744.10
Turmeric	19,500	7,740
Coriander	17,300	3,780.50
Cumin	10,850	5,900.20
Celery	3,050	732.10
Fennel	5,000	1,410.50
Fenugreek	7,200	1,341.20
Other seeds	1,750	585.00
Garlic	3,350	444.75
Other spices	15,500	5,600.00
Curry powder	3,700	2,083.60
Mint oil	2,500	7,050.00
Spices oleoresins & other oils	2,000	21,772.50
Total	1,57,240	1,23,232.75

{Business Line, 13 March 1999, 13}

300 Export of agricultural and processed food products

QTY: IN MTS., VALUE: IN RS. LAKHS

PRODUCTS	1995-96		1996-97		1997-98	
	QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
GROUP: OTHER PROCESSED FOODS						
GROUNDNUTS	118908.000	23068.58	151354.858	33159.30	245129.259	56629.96
GUAR GUM	83283.400	22720.25	95169.925	35612.59	102728.605	54498.83
JAGGERY & CONFECTIONERY	245851.747	15395.64	199726.358	26111.95	83038.163	12793.18
COCOA PRODUCTS	952.777	884.84	1236.458	979.85	1041.514	925.27
CEREAL PREPARATIONS	47561.897	10386.52	27150.259	10885.26	22703.907	11595.23
ALCOHOLIC BEVERAGES	14214.195	4384.29	133917.561	18782.34	37075.928	7035.14
MISCELLANEOUS PREPARATIONS	27730.991	7160.76	7159.489	6828.10	8891.417	3854.91
MILLED PRODUCTS	468827.000	33196.29	708358.277	51231.37	23110.970	2156.29
GROUP TOTAL :	1007330.007	117197.17	1324073.185	183591.76	523719.763	149488.81
GROUP: CEREALS						
BASMATI RICE	373314.000	85066.86	523126.822	124763.38	592678.258	168502.69
NON BASMATI RICE	4540699.000	371740.81	1988847.213	192472.18	1796279.554	168536.89
WHEAT	632468.000	36676.23	1145895.170	69845.18	—	—
OTHER CEREALS	28097.000	1696.53	71035.115	4864.60	15348.526	1259.40
GROUP TOTAL :	5574578.000	495180.43	3728904.320	391945.34	2404306.338	338358.98
TOTAL :	7512867.124	793233.16	6135979.590	772280.29	3997633.838	727075.73
GROUP: FRUITS AND VEGETABLES						
FRESH ONIONS	350989.166	23072.12	427011.767	26521.18	333348.958	20246.09
OTHER FRESH VEGETABLES	83411.736	7047.28	71850.941	7594.43	98348.914	11407.08
WALNUTS	6925.743	8240.39	5807.939	7893.17	3889.595	5647.60
FRESH MANGOES	22269.166	3851.92	24773.481	4487.64	42894.927	7359.61
FRESH GRAPES	22414.032	5475.97	20999.294	5264.66	23808.120	6601.28
OTHER FRESH FRUITS	58095.211	5427.92	166172.605	6471.26	64605.088	7265.84
GROUP TOTAL :	544105.054	53115.60	716616.027	58232.34	566895.602	58527.50
GROUP: PROCESSED FRUITS & VEGETABLES						
DRIED & PRESERVED VEGETABLES	104067.946	24765.78	88675.538	23107.54	200262.704	47988.99
MANGO PULP	36023.330	8461.28	40302.220	10500.63	45874.526	12531.22
PICKLES & CHUTNEYS	15597.263	5255.18	18390.314	5643.23	24372.265	7670.51
OTHER PROCESSED FRUITS & VEGETABLES	37821.021	10676.97	27884.416	8126.36	28421.797	7958.95
GROUP TOTAL :	193509.560	49159.21	175252.488	47377.76	298931.292	76149.67
GROUP: ANIMAL PRODUCTS						
BUFFALO MEAT	159703.906	55500.33	157573.995	61903.59	176328.677	72930.39
SHEEP/GOAT MEAT	8612.802	5642.54	8691.191	7103.53	7546.598	6265.66
POULTRY PRODUCTS	10067.416	2621.33	16682.908	8143.72	11040.461	8884.14
DAIRY PRODUCTS	4712.076	3256.96	2018.485	1536.53	2378.238	1338.71
ANIMAL CASINGS	325.141	830.00	446.382	1227.04	371.218	1195.84
PROCESSED MEAT	476.638	407.13	511.994	444.73	264.773	222.02
GROUP TOTAL :	183897.979	68258.29	185924.955	80359.14	197929.965	90836.76

IMPORT**301 Import of edible oils**

Year	Total	Pal m	Sun flow er	Soy bea n	Rap eseed	Oth ers
1994 -95	0.98	0.68	0.06	0.17	0.02	0.05
1995 -96	1.48	1.21	0.13	0.07	0.03	1.04
1996 -97	1.75	1.23	0.41	0.05	0.03	0.03
1997 -98	2.08	1.47	0.18	0.30	0.09	0.04
1998 -99*	0.99	0.46	0.23	0.17	0.12	0.01

* November 1998 to February 1999
(Financial Express, 16 April 1999, 10)

TRADE INFORMATION**302 UNDP grant for hybrid rice/spice technology**

The United Nations Development Programme (UNDP) has granted over \$ 3.5 millions for the development and large-scale adoption of high-yielding technologies in the rice and spice sectors in India. The hybrid rice technology programme, which was allotted \$2.55 millions, would be undertaken with technical assistance from the United Nations Food and Agriculture Organisation (FAO), a report on UNDP's India activities said. "The programme would build upon a successful earlier phase supported by UNDP since 1991, which had undertaken the development of seven public hybrids suitable for irrigated areas," it said.

"To ensure food security in the country about 25% more rice needs to be added to the national food basket,"

it said, adding the new programme would work to achieve a research base on systematic seed production and transfer of technology in this sector. In the spices sector, the UNDP was providing a grant of \$1.12 millions for a 3-year programme which targeted among other, developments of organic spices and direct export by small scale industry sector in the country, it said.
(Business Line, 3 June 1999, 13)

303 Uttar Pradesh sets up panel on food processing

The Uttar Pradesh government has constituted a 10-member Industrial Development Industrial Development Committee to give impetus to the food processing industry in the state. The committee would prepare long-term development schemes for food processing and related industries to ensure better capital investment, additional employment generation and quick disposal to the problems being faced by the sector. According to industrial development commissioner and principal secretary AP Verma, the orders for the constitution of the committee had been issued.
(Financial Express, 20th April 1999, 10)

304 First Web Site on Indian Dairy Industry

The publishers of Dairy India Yearbook have announced the hosting of an exclusive web site on the Indian Dairy Industry on the Internet. Its address is <http://www.IndiaDairy.com>. The web site projects India's dairy products and services and provides a ready low cost opportunity to Indian dairy organizations to project their

capabilities, products and services worldwide.

Details can be hand from:
Dairy India Yearbook, A-25
Priyadarshini Vihar, Delhi-110092,
India; Phones: (91-11) 2243326,
2045681, Telefax: (91-11) 2243039,
Emails: Yearbook@vsnl.com.
{*Indian Food Packer* 53(1), 1999, 84}

305 Processor Directory Series

The 80th Anniversary edition of the Processor Directory Series of the International Association of Food Industry Suppliers (IAFIS) is now available and for the first time is being offered to nonmembers. The 1999 Processor Directory Series contains six directories. A detailed listing of dairy, noncarbonated-beverage, and food plants is contained in the U.S., Canadian, and Latin American directories; and three special edition-directories concentrate on U.S. dairy plants – Fluid Milk Directory, Ice Cream Directory, and Cheese/Cultured Products Directory.

To order a hard copy a diskette (for sorting and creating mailing lists), or to get a price listing, contact Chris Rao (crao@ifis.org) or Scottoe Cheatham (scheathaam@ifis.org) at 703-761-2600.
{*Food Technology*, 53(3), 1999, 16}

NEW INDUSTRIES AND TRAINING CENTRES

306 State-of-the-art food processing plant

Kiran Foods Pvt. Ltd., a 50/50
joint venture with Kitchen Range

Foods Ltd of UK, has set up a state-of-the art food processing plant just outside Mumbai. The plant built with an investment of Rs. 200 million is one of the most modern food plants in the country today. Kitchen Range Foods, a 30 million company, is a speciality frozen foods company having three plants around Cambridge. Kitchen Range has brought to India proprietary technology to produce “formed and coated vegetable products and its line of fruit pies.” It supplies these products to McDonald’s all over Europe and the Middle East. Kiran was incorporated to supply the McDonald’s chain of restaurants in India with quality processed foods and to develop India as a low cost option to supply McDonald’s in the Middle East. Today the vegetable nugget that was specially developed for the Indian market is a big success with its Indian customers.

The plant has a capacity to process 5000 MT per year of ready to cook, frozen products. It has two IQF units and two Koppens lines. The entire processing area is constructed of insulated hygiene panels and is atmosphere controlled with temperatures ranging from 10 to 18 degrees celsius. This goes a long way in keeping the microbiological load in the products under control. The company has just launched its range of “ready to cook” products in the retail market under the brand name “JIFFY”. This range of frozen products is now available in select outlets across Mumbai and will soon be launched across the country. The company also has a range of chicken and vegetable frozen products for its institutional customers. This range provides the food service sector an

alternative that is convenient but still tasty of labor and cooking time.

(British Commercial News November/December, 1998)

307 Cito installs training centre in Germany

Cito-System GmbH opened a Training and Seminar Center here last October. In the Seminar Center, courses are given in diecutting theory and practice for upto 25 participants at a time. Each participant receives a comprehensive manual on the basics of diecutting. In the Training Center, diecutting technology is demonstrated on the SP 102 E-II diecutting machine manufactured by Bobst SA, Lausanne, Switzerland. The new center includes a laboratory for quality tests and analyses on diecutting and creasing techniques. More than 120 participants have enrolled in at least one of five courses the Training Center offers. Seminars are offered in German, English or Spanish. Six "Perfect Diecutting and Creasing" seminars are scheduled for this year. Topics of the seminars include diecutting forms, creasing systems, rubbering technique, nick-grinding, quality management, knife make ready, organization, and efficiency.

The Training Center is also used for research and development. Cito-System is supported in research and training by a number of companies, including Bobst SA, Mayr-Melnhof Karton GmbH & Co. KG, Fronleiten/Austria, and Marbach Stanztechnik GmbH, Hellbronn, Germany.

(Paperboard Packaging 84(2), 1999, 428)

308 Food processing training centre

A food processing training centre has been established at a cost of Rs. 4 lakhs in the Non-Conventional Energy and Rural Development (NERD) Society, which is basically a voluntary women organisation. The Ministry of Food Processing Industries has sanctioned a grant of Rs. 3 lakhs for the training centre. According to Ms. K. Sathia Jothi, President, NERD Society, training programmes would be conducted throughout the year with the support of the State Agro Industries Corporation. Rural Development Agency and the Central Ministry of Food Processing Industries.

(Business Line, 9 April 1999, 13)

309 Food Technology Transfer Centre at Teesside

Food safety minister Jeff Rooker has officially opened the new regional food technology transfer centre (TTC) at the University of Teesside, Middlesbrough. Following the success of the original centres, the Ministry of Agriculture, Fisheries and Foods decided to extend the initiative to a second phase – South Bank University in London, Reading University and the University of Teesside – to assist local companies in matters of food safety, quality and technology. A joint initiative by MAFF and the University will provide training, advice and technological expertise to the region's food and drink manufacturers – some 250 companies employing 25,000 people. The centre is supported by the industry and the EU. Mr. Rooker said that the centre had the potential to

make an important contribution to improving food safety, which was one of the Government's priorities.
{*Food Manufacture* 74(5), 1999,5}

310 Formation of the International Association of Fish Inspectors

A new international body for sharing information and promoting cooperation among fish inspectors around the world is being formed. The Canadian Food Inspection Agency (CFIA) has taken on a coordinating role in the creation of the International Association of Fish Inspectors (IAFI). IAFI is currently being incorporated as a federal not-for-profit association with its first start up meeting to be planned later this year. The IAFI will be an open organization with representatives from government, industry, academia, and public and private organizations in fishing, fish processing and fish consuming nations around the world.

The association will facilitate an exchange of information, ideas and methodologies, encourage collaboration between fish inspection colleagues, and promote research and education in fish and seafood inspection. A Web site is under construction and should be available by the end of February. IAFI originated at an international fish conference in Toronto, Ontario, Canada in September of 1997. A steering committee was developed with members extending from the UN Food and Agriculture Organization, the US, New Zealand, Thailand, Mozambique, the UK and Canada. In its present time, the committee has produced a charter, mission, and

vision for the association, and proposed bylaws have been drafted. The committee is presently conducting a membership drive for anyone interested in participating in the association. The initial IAFI meeting is proposed to be held in the inaugural meeting on October 4 and 5, 1999 in Halifax, Nova Scotia, Canada.

To request more information or to request an application for membership regarding the International Association of Fish Inspectors, please E-mail IAFI@cm.agr.ca.
{*Dairy, Food and Environmental Sanitation*, 19(3), 1999, 198}

311 Virtual Centre for Food Science and Assessment

The Victorian Minister for Tertiary Education and Training, Phil Honeywood, has announced that a new \$3.5 million state-of-the-art centre will be established in the Goulburn Ovens region. The proposed Virtual Centre for Food Science and Assessment, to be located at the Shepparton campus of the Goulburn Ovens Institute of TAFE, will be the first of its kind in Victoria. The CEO/Director of Goulburn Ovens Institute of TAFE, Peter Ryan, commented, "This development will help us achieve our strategic objective to assist in the economic development of the Goulburn N-E region. I am very grateful for the support from the Minister and our local members in achieving this significant Capital Grant for this region."

The Centre will be equipped with the latest in multimedia technology with internet connections

available, laboratory equipment, simulators and demonstration equipment to provide both hands-on on-line training for food industry personnel. Access to these resources will allow greater multi-skilling in the food industry. It is envisaged that this access to on-line training will be extended to other industry areas such as hospitality and tourism. The provision of a 24-hour access to course advice and resources such as a CD-ROM and video library will give the food industry shift workers, who traditionally found it difficult to participate in training in business hours, the opportunity to upgrade their skills. The Centre will include resources for video-conferencing, allowing information and training sessions to be conducted from a number of locations, and the opportunity for practical demonstrations to be conducted and assessed from different sites.

{Food Australia, 51(5), 1999, 189}

FOOD REGULATION QUALITY CONTROL AND HYGIENE

312 Food certification scheme in India

In India, the Bureau of Indian Standards (BIS) has launched a certification scheme specifically aimed at the food industry. The Hazard Analysis Critical Control Points (HACCP) system is expected to enhance the marketability of Indian food products in international markets. The new certification scheme conforms with all international requirements and covers preparation, processing, packaging and storage in

the food processing industry. The scheme is based on "IS 15000: 1998 HACCP system and guidelines for its application" as laid down in the Codex Alimentarius Commission.

{Asia Pacific Tech Monitor, 16(3), 1999, 9}

313 Sweetener blend in soft drinks permitted

The Government has permitted a combination of two artificial sweeteners – aspartame and Acesulfame-K (potassium) (ASK) – in carbonated water and soft drink concentrates under proper label declarations. The PFA Rules, 1955, already permits the use of each of these two artificial sweeteners individually in sweetened carbonated water and soft drink concentrates, subject to a minimum level of five per cent sucrose or sugar content, also being present in these products.

The new notification permits the use of the two artificial sweeteners in combination, within prescribed limits, to allow the benefit of the synergistic sweetener enhancement, resulting from this combination. However, it does not remove the mandatory requirement of five per cent sucrose content in these products. Hence, all carbonated water containing artificial sweeteners will have the minimum stipulated sugar content also, according to an official release. It may be noted that softdrink major, Pepsi Foods Ltd., the wholly owned subsidiary of Pepsi Co. Inc of the US, has already announced the launch of its carbonated cola drink, Pepsi, using the combination, ASK.

{Business Line, 4 June 1999, 2}

314 Edible Oils Packaging Order, 1998

G.S.R. 710(E) - In exercise of the powers conferred by section 3 of the Essential Commodities Act, 1955 (10 of 1955), the Central Government hereby makes the following order to amend the Edible Oils Packaging (Regulation) Order, 1998, namely: -

1. (1) This Order may be called the Edible Oils Packaging (Regulation) (First Amendment) Order, 1998.

(2) It shall come into force on the date of its publication in the official Gazette.

2. In the Schedule I to the Edible Oils Packaging (Regulation) Order, 1998, for para 1, the following para shall be substituted namely:-

1. Every container in which edible oil is packed shall bear the following particulars in English or Hindi in Devnagiri script:

- (a) the name, trade name (if any);
- (b) name and address of the packer;
- (c) the name/description of the contents;
- (d) the net mass/volume of the contents;
- (e) the batch no., month and year of manufacture; and
- (f) registration No.

Provided that nothing contained in this para, shall prevent the use of any other language in addition to the language required under para".

{Gazette of India (Extraordinary) Part II, Section 3, Subsection (I) No. 465; 1998; 2-3}

315 Prevention of Food Adulteration Rules, 1955

G.S.R. 693(E).- Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section(1) of Section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health). G.S.R. 548(E), dated the 17th September, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i) dated the 17th September 1997, inviting objections and suggestions from the persons likely to be affected thereby before the expiry of period of sixty days from the date on which copies of the Gazette of India in which the said notification was published were made available to the public;

And whereas the copies of the said Gazette of India were made available to the public on 26th September 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of Section 23 of the said Act, the Central Government after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

1. (1) These rules may be called the Prevention of Food Adulteration (11th Amendment) Rules, 1998.

(2) They shall come into force on 20th day of May, 1999.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as said rules), in rule 4 in sub-rule (6) for the letters and figures "Rs. 200" wherever they occur, the letters and figures "Rs 1000" shall be substituted.

3. In Appendix 'A' to the said rules, in FORM 1 and FORM 1-A for the letters and figures "Rs 200" wherever they occur, the letter and figures "Rs 1000" shall be substituted.

[No. P. 15014/3/96 PH (FOOD)]

RENU SAHNI KHAR, Jt. Secy.

{Gazette of India (Extraordinary) Part-II Section 3 Subsection (i) No. 456; 1998, 4-7}

316 Indian Food Standards

IS 2347:1987	Domestic pressure cookers
IS 3984: 1967	DW- flour bags
IS 4246:1992	Domestic gas stoves for use with liquefied petroleum gases
IS 10325:1989	Square tins- 15 Kg for ghee, vanaspati, edible oils and bakery shortenings
IS 10633: 1986	Vanaspati
IS 11951:1987	Pumpset for dessert coolers
IS 12650:1989	Jutebags for packing food grains 50 Kg

{Standards India, 12(12), 1999, 307-310}

317 ISI mark for neem-based pesticides

In a significant step towards promoting the use of eco-friendly and biodegradable pesticides, the first ISI mark for neem-based pesticides has been granted to the Belgaum-based Mukumbi Manufacturing Co. The product is covered under IS 14300: 1995 Indian standard specification for neem-based EC containing azadirachtin. This pesticide was a natural plant extracted from neem seeds/kernels which contained azadirachtin for insect repellent activity, a release by the Bureau of Indian Standards said on Tuesday. The use of neem-based pesticides is commercially viable in India because of the abundance of neem trees. The pesticide is extremely effective for agricultural crops such as cotton, paddy and pulses. The neem seeds/kernels contain triterpenes which is known to have active derivatives including azadirachtin. Unlike the chemical pesticide, the neem-based pesticides does not leave behind any residue.

{Business Line, 2 June 1999, 13}

318 Natural Toxicants in Foods

Toxicants in food can be of two types, natural toxicants and those which become toxic under special circumstances. Natural toxicants are normal components which constitute the genetically-determined chemical profile of the plant which serves as food. Vegetables, fruits and legumes bought in the market or grown in your own kitchen garden could contain lethal poisons hidden within. For example, potato, a staple food in many parts of the world and one among the

ten major food crops of the world, if consumed beyond a limit could leave you in a nervous wreck. It is because potatoes contain two alkaloids called solanine and chaconine which show anticholinesterase activity; it interferes with transmission of nerve impulses. Hence, physicians advice epileptic patients to avoid potatoes in their diet. One kilogram of potato contain 200 mg of solanine. Certain other foods contain chemicals which upsets the normal metabolic and physiological functions in the body. Lima beans, tapioca, cassava and almonds contain cyanide (as cyanogenic glycosides); cyanide inhibits cytochrome oxidase in the respiratory chain and causes fatal human poisoning on ingestion of 0.5-3.5 mg/kg body weight. This works out to approximately 50-300 mg of cyanide per adult. Lima beans of different varieties can produce 10-18 mg cyanide per 100g seeds. Oxalate, which is present in spinach and rhubarb to the extent of 10 per cent of dry weight combines with dietary calcium, preventing its absorption in the gut. Cabbage, cauliflower, brussels sprouts, broccoli, kale and turnips contain goitrogens which interfere with iodine utilisation leading to development of goitre (enlargement of the thyroid gland). High fibre foods like cereals, legumes and vegetables contain phytates which bind to calcium, zinc and iron and cause the deficiency of these minerals leading to anaemia, osteoporosis etc. Some of the food toxicants interfere with action of digestive enzymes.. Protease inhibitors are found throughout the plant kingdom. Legumes like soybean contain trypsin inhibitors. But most of it's harmful

effects disappear when raw beans are cooked.

Certain chemicals which are present in plants when consumed by humans could affect their psyche. Carrots, parsley and common spices like nutmeg and pepper contain myristicins which is a narcotic and psychomimetic. Several herbs which are commercially available for smoking and for preparing tea contain psychoactive agents and the excessive use of these herbs could cause intoxication. *Lathyrus sativus* (L.) (Kesari dal), is used as cattle feed in some countries and in making bread when wheat is in short supply. When eaten in small quantity, the seeds are used as valuable food. But, if consumed as the main source of food, it can cause lathyrism which is frequent in certain regions of Andhra Pradesh and Madhya Pradesh. This condition usually develops in individuals between 15 and 30 years more often in men. The first symptom of lathyrism a feeling of heaviness of the legs with weakness setting in thereafter serious abnormalities of the bones, joints and large blood vessels. The disease is caused by a toxic agent aminopropionitrile and related compounds present in the seeds of the *L. sativus*. B - aminopropionitrile inhibits the action of an enzyme called lysyl oxidase resulting in reduced cross - linking in collagen (the most abundant protein in the human body) of lathrytic patients.

Cycads are palm-like trees growing mainly in the tropics. The seeds of these plants are used as a supplement in some parts of the world when food supplies are low. The seeds contain a toxin called methyl

azoxymethanol, which is a cancer causing agent.

Substances toxic under special conditions : Favism - sensitivity to fava are broad beans - is one such example. In sensitive individuals, consumption of these beans in any form leads to haemolytic anaemia. This is due to the absence of an enzyme called glucose - 6 phosphate dehydrogenase in their red blood cells which protect the red cells from the oxidative damage. Individuals with celiac disease cannot tolerate certain fractions of wheat grain. When a protein called gluten is removed from the diet, they feel better. Another example is Jamaican vomiting sickness. Ingestion of unackee, a local jamaican fruit causes vomiting and a sense of weakness initially, leading to convulsions, coma and often death. This fruit contains an unusual amino acid called hypoglycin which inhibits amino acid and fatty acid oxidation.

Fern, tea and betel nuts contain large amounts of tannins, polyphenols and caffeic acid. When consumed in high amounts, they cause thiamine deficiency. Most food have various non-nutrient substances, including toxicants in very small amounts. But many of these substances do not necessarily create a health hazard because individual toxicants are not consumed alone and their concentration are very low. Some are destroyed on cooking. In the amount present, many naturally occurring toxicants are detoxified in the body and the toxicities of thousands of chemicals in our daily diet are not cumulative. Different toxicants in the diet may have antagonistic interaction so that toxicity of one chemical may be offset by the presence of another.

PERSONALIA

Consuming a variety of food ensures that there is little chance of any one chemical reaching the toxic level. Illness, however, can result from eating abnormally high amounts of one food containing a naturally-occurring toxin.

{*Science Express*, 4 May 1999, 1}

319 A new margarine to lower cholesterol

A new margarine developed by Canadian scientists can lower harmful cholesterol by nearly 25% when people eat it daily. The research showed how easily fat-like products derived from trees and other plants, known as plants sterol esters, can act to lower cholesterol and thus reduce the risk of heart disease. Peter Jones and colleagues at McGill University in Montreal said they were able to lower average levels of bad cholesterol – the LDL cholesterol that is deposited inside arteries – by feeding men a diet moderately low in fat and giving them the experimental margarine three times a day.

The product, Jones' team used, was called tall oil – a by-product of paper industry. A Vancouver - based company has teamed up with Swiss drug giant Novartis to produce and market the product as Phytrol. Phytrol is slightly different from the margarine already available in the market but has similar effects, Jones said.

{*PTI Science Service*, 18(12), 1999, 13}

320 Dr. O.S.Tomer as Director, NDRI, Karnal

O.S.Tomer has been appointed as the Director, National Dairy Research Institute (NDRI), Karnal. He was earlier director of NDRI and subsequently transferred to Indian Veterinary Research Institute (IVRI), Izatnagar as its Director. He has headed many divisions and institutions which include Krishi Vignan Kendra and Trainers' Training Centre of the Institute and Division of Cattle Breeding and Genetics. He was also appointed as the Joint Director, NDRI. He has a doctorate in Livestock Production and Management.

{*Indian Dairyman*, 51(4), 1999, 31}

321 Fennema as Scientific Editor of *Journal of Food Science*

Owen.R.Fennema, Professor Emeritus in the Dept. of Food Science, University of Wisconsin at Madison and Treasurer of IFT's Executive Committee, has been appointed Scientific Editor of IFT's *Journal of Food Science*. Fennema succeeds Robert E.Berry, who retired as *JFS* Scientific Editor at the end of 1998.

{*Food Technology*, 53(3), 1999, 92}

FORTHCOMING CONFERENCES

September 29-October 1, 1999, Quality Management in the Food Industry: A three day introductory course at Statler Hotel, Cornell University, Ithaca, NY is designed to provide a basic understanding to the many quality process choices involved in implementing a quality management system. Course fee: \$700 (IFT members)/ \$750 (non-members). Co-sponsored by IFT Continuing Education Committee, IFT Quality Assurance Division, and Cornell University. Course Faculty: R.Gravani, J.McAnelly and J.Surak.

October '99, Frozen Food Festival The National Frozen Food Association's (NFFA's) first annual October Frozen Food Festival will be held in 1999, giving the frozen food industry another month to create excitement in the frozen food product category.

October 1-2, Membrane Technology in Food and Bioprocessing, University of Western Sydney Hawkesbury, Richmond, Jenny Carney; e-mail: J.CarneyUWS.edu.au.

October 1-3, 1999, 40th annual Meeting of the American College of Nutrition (ACN), Washington, DC. Contact: S.Wallach, ACN, Hospital for Joint diseases, 301 E, 17th St., New York, NY 10003.

October 3-6, 1999, New Products Conference, will be held at The Buttes Resort, Phoenix, Arizona. Email: tkimberly@cahners.com. web: www.preparedfoods.com.

October 3-8, 1999, The 10th World congress of Food Science and Technology and World food Expo will be held in Sydney, Australia. Email: foodaust@foodaust.com.au.

October 3-10, Tasting Australia, Australian Regional Food and Wine Expo, Adelaide, Rebecca Somerfield; email: somerfield.rebecca@saugov.sa.gov.au, web: www.tasting-australia.com.au.

October 4-5, 1999, Flavor interaction, a 2-day program held in Chicago, IL will provide an update on the latest flavor technologies in: basic flavour chemistry, flavor interactions, measuring changes, and flavor applications. Program Director: Felix Germino.

October 4-7, Nutrition Week 1999, Dairy Foods and Cardiovascular Health, San Francisco, USA, Anne Divjak; email: adivjak@idfa.org.

October 5-7, 1999, Techno Pharm '99 The first TechnoPharm international exhibition, the main exhibition forum for production supplies for the European pharmaceutical industry and its closely related segments such as cosmetics, personal hygiene and health foods, takes place in the Exhibition Centre, Nuremberg. e-mail: j.fuchsgruber@nuernbergmesse.de. web: www.technopharm.de. organiser of TechnoPharm: NurnbergMesse GmbH, Messezentrum, D-90471 Nurnbeg. Sponsor : APV, Arbeitsegemeinschaft fur pharmazeutische, e.V. Verfahrenstenchnik, Kufurstenstabe 59, D-551 81 Mainz.

October 5-8, China FoodTech 99
China International Exhibition
Centre, Beijing, CIEC Exhibition
Company (HK), Limited, Hong Kong.

**October 7, 1999, The 23rd World
Congress and Exhibition of the
International Society for Fat
Research (ISF)** will be held at The
Brighton Centre, Brighton, England
and is sponsored by the 24 ISF
member organisations comprising the
largest federation of fats and oils
organisations in the world.

**October 9-14, 1999, Anuga - The
Wonderland for Frozen Foods**, a
top food and drink event which is held
at Cologne has 6,510 exhibitors
exhibiting on 19,000 sq. meters of hall
space.

**October 10-12, 1999, The 11th
Eastern Food Science Conference
(EFSC-XI)**, a major regional
conference of the Institute of Food
Technologists, will be presented at the
Hershey Lodge and Convention
Center, Hershey, PA.

**October 11-15, International
conference on Orient foods** at
Beijing, China, CIFST, Beijing.
Email: cifst@public.bta.net.cn.

**October 12-13, Conference on New
Process and Ingredient
Technology for Bakery foods**,
Cheery Hill, NJ. For further
information contact: American
Institute of Baking, 1213, Bakers
Way, Manhattan, K.S. 66502, web:
www.aibontine.org.

**October 13, 1999, Functional
Foods** A one-day conference at

Hershey, PA will cover defining and
marketing of functional foods,
business, science and the law. Topics
of science to be discussed:
antioxidants, dietary fiber, prebiotics,
probiotics, allyl sulfides,
isothiocyanates, indoles, fatty acid,
flavonoids and phytoestrogens.
Program Director: Dennis Gordon,
North Dakota State University.

October 13-14, Foodtech 99,
National Exhibition Centre,
Birmingham. This event will focus on
food hygiene, safety and quality.

**October 16-18, Diet Expo, The 15th
International Exhibition for
Health Food and Natural Beauty
Products**, Paris-Expo, Porte de
Versailles, France, Susan Reid, Reed
Exhibitions Companies; email:
susan.reid@reedbusiness.com.au.

**October 18-20, Pack Expo Las
Vegas 99** co-located with IEFP 99,
Sands Expo & Convention Centre, Las
Vegas, NV, USA. Email:
expo@pmmi.org. web: www.packexpo.com.

**October 18-20, Third International
Food Safety and HACCP
Conference**, Grand Hotel Huister
Duin, Noordwijk, The Netherlands,
Bastiaanse Communication; email:
bascongr@worldonline.nl.

**October 18-21, B & D Shanghai
Trade Fair for brewing and drinks
technology**, Shanghai, China, Messe
Munchen; email: info@messe-muenchen.de.

**October 19-22, Food
Manufacturing Technology**,
National Exhibition Centre,
Birmingham, UK, Reed Exhibition

Companies;
inquiry@reedexpo.co.uk.

email:

October 19-22, Auspack 99,
 Melbourne Exhibition Centre,
 Exhibition and Trade Fairs Pty Ltd.

October 26-28, 1999, Atlanta fruit Symposium, The Atlanta group one of Europe's largest fruit and vegetable marketers, will hold a fruit symposium in the Bremen convention centre as part of the third German Foreign trade Event. Contact: Atlanta Group, Bremen.

October 28-31, Worldwide Food Expo '99, a global food technological event is being held at McCormick Place, Chicago, IL, USA. The show is cosponsored by the American Meat Institute (AMI), National Fisheries Institute (NFI), International Association of Food Industry Suppliers (IAFIS), National Food Processors Association (NEPA) and the International Dairy Food Association (IDFA).

October 30-31, International Seafood Fair, Geelong Victoria, Australian Exhibition Services; email: tblake@ausexhibit.com.au.

October 31-November 3, 1999, 3rd International Symposium on the Role of Soy in Preventing and Treating Chronic disease, Omni-Shoreham Hotel, Washington, DC. Contact: Meetings and Exhibits Department, AOCS, P.O.Box 3489, Champaign, IL 61826-3489; email: meetings@aoocs.org.

October 31-November 3, 1999, 19th International Symposium on the Separation of Proteins, Peptides

and Polynucleotides, Delray Beach, Florida. Contact: Barr Enterprises, P.O.Box 279, Walkersville, MD 27139/ web: www.ZORBAX.com/isppp.

November 9-11, 1999, Gum Chemistry and Technology, Chicago, Illinois. It imparts a practical understanding of gum characteristics, handling and use. Course fees: AACC members \$ 945; nonmembers \$ 995. Contact: short course department at AACC. Email: aacc@scisoc.org.

November 9-11, 1999, The 19th ASEAN Postharvest Technical Seminar will be held in Ho Chi Minh City, Vietnam. The theme for the seminar will be "Quality assurance in agricultural produce". Contact: Greg Johnson at ACIAR; email: johnson@aciar.gov.au.

November 23-26, 1999, International Packaging Exhibition will be held at China International Exhibition Centre in Beijing.

December 13-16, 1999, Upakovka 99 and Upak Italia 99, International Trade Fair for Packaging Machinery and Equipment, Packaging materials and Package Printing will be jointly held at the Krasnaya Presnya Fairgrounds in Moscow, Russia. Products and technologies for the packaging industry will be exhibited at the trade fairs.

SPECIAL ARTICLE

Whey and whey proteins in geriatric nutrition*

Beginning from October 1, 1998, the United nations is observing the year of "Older Person" and will observe the International Day of Aged Persons on October 1, 1999. In this context, the focus of this article is on the nutritional requirements of the older persons.

Geriatrics is considered as a state of maturity during which nutritional requirements undergo considerable change. For certain nutrients a negative balance is established. Therefore, food requirements decline among the elderly. Both physical and social factors as well as decreased energy expenditure may be a part of the explanation for the decreased food intake. Therefore, after the ages of 65 to 70 decrease in body weight is common in elderly who often do not eat enough to meet their energy requirements.

It is believed that nitrogen and amino acids requirements per unit body weight do not seem to decline with ageing, whereas the daily energy requirements are usually reduced. Therefore, an adequate diet for the elderly should be somewhat higher in protein relative to energy intake than in diets for younger adults. At the same time the frequency of illness increases in this age group which again adds to an increased requirement for protein intake for tissue maintenance and repletion. For this group of consumers a higher intake of regular food is not the answer to the problem of supplying more protein. Liquid food or protein enriched drinks could be an attractive way of increasing the daily protein intake since fluid requirements (also for people with a poor appetite) is more easily met than the demand for protein and calories by solid food.

Whey and whey protein concentrates with varying degree of protein contents and the liquid

*{Food Digest' acknowledges the author Mr. D.B.Puranik, Associate Professor, Department of Dairy Technology, Veterinary College, UAS Campus, Bidar-585 401 for his permission to reproduce this article}

ets prepared thereof could be a suitable diet for the geriatrics. Utilization of whey proteins for the preparation of geriatric foods represents a promising avenue for new product development and product diversification.

NUTRITIONAL STATUS OF THE GERIATRICS

There is an interrelationship between ageing and nutrition. Ageing is sometimes defined as the physiological changes that occur from conception until old age or ageing is defined as changes occurring in adult food, when growth has stopped.

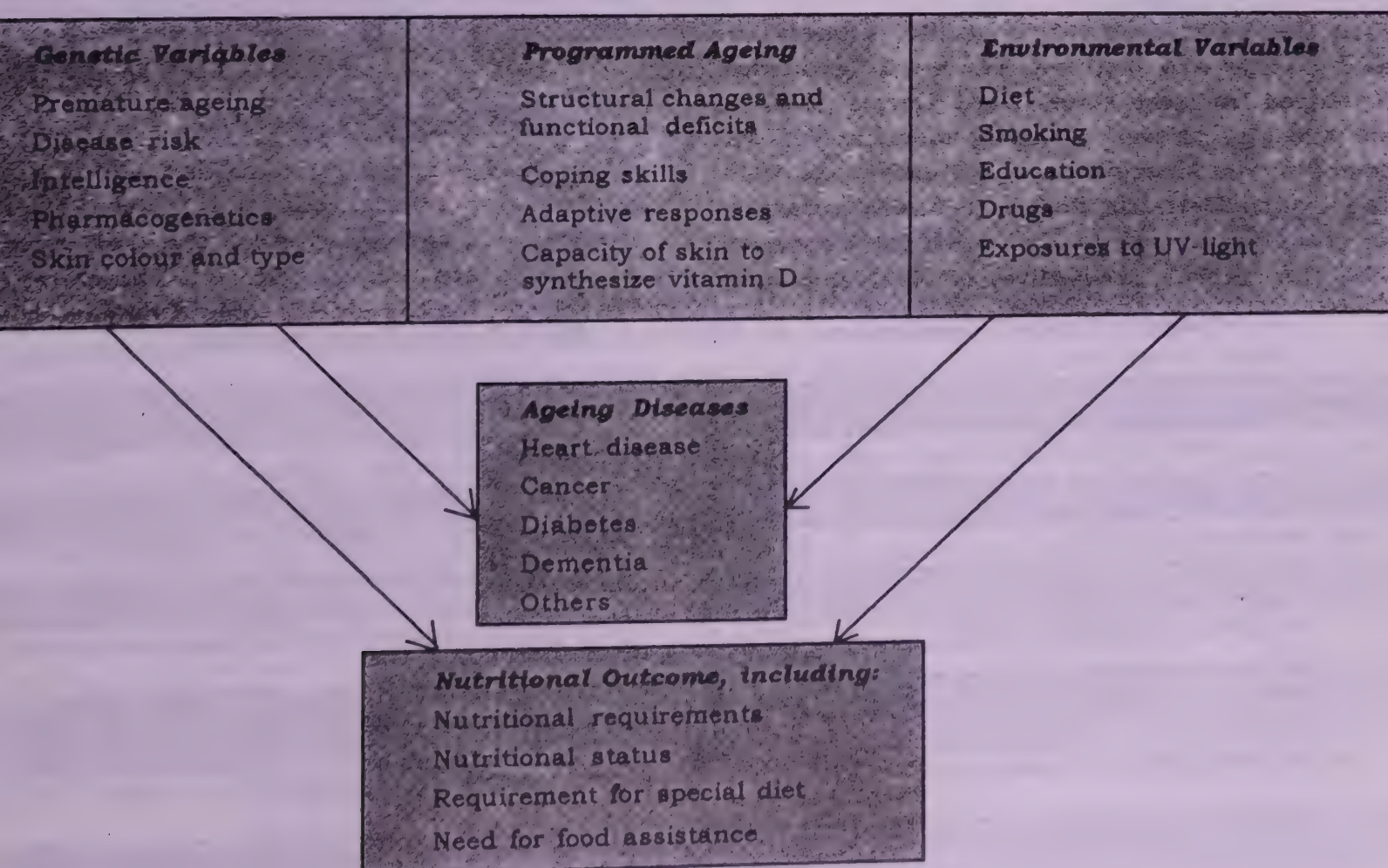
On the one hand, nutrition is considered to be one of the key determinants of the process of ageing. On the other hand, as a result of ageing, changes take place in appearance, in the functional capacity of the body and in the body's capacity to adapt to physical stress; these changes affect nutritional requirements. In the ageing process it is hard to distinguish between changes that

result from old age *per se* and changes that are the consequences of disease. Figure 1 shows factors that affect the ageing process.

The Immune System

The elderly are more vulnerable to diseases compared to the young adults. The pattern of illness and the common causes of morbidity, such as infection, cancer, autoimmune and immune complex disorders and degenerative disease, confirm the well-documented age-related decline in immune function. Thymic involution is thought to be the central mechanism responsible for the decrease in T-cell function and diminution in cell-mediated immunity that occurs with ageing. Modest declines in humoral immunity have also been reported. These changes result in diminished host defences against the above mentioned diseases. Studies in a number of animal models have shown that a restriction of energy intake delays immunological senescence so that T-cell marker re-

Figure 1. Effect of Ageing on Nutritional Outcome Variables (Roe D.A. 1990).



mains intact, lymphokine levels do not decrease and a unique population of B cells with T-cell marker remains detectable for extended periods of time. Paradoxically, studies in humans have shown that protein-energy malnutrition and deficiencies of several individual nutrients result in impaired immune responses, especially cell-mediated immunity. Correcting nutritional deficiencies in older people can result in significant improvement in host defence.

Nutritional Requirements of Elderly

Nutritional requirements of elderly and very old people may be set with different objectives. The values may serve either diagnostic or prescriptive purposes, but the ultimate goal will always be to set requirements that should be met to improve the quality of life. The heterogeneity of the target population, in terms of needs and goals, dictates that nutritional requirements are largely extrapolated from those of younger populations taking age-related changes into account.

NUTRITIONAL SIGNIFICANCE OF WHEY PROTEIN

Whey protein in itself has a very high nutritive value, even higher than the protein normally used as standard of comparison — the egg proteins. β -lactoglobulin and α -lactalbumin make up approximately 80 per cent of the whey proteins. They are rich in essential amino acids containing 53.8 and 52.1 gm of these acids per 100 gm of protein, respectively. All albumin fractions have

a high concentration of lysine and leucine. Alpha-lactalbumin has the highest content of tryptophan of all natural proteins. The high concentration of methionine in β -lactoglobulin, of phenyl alanine in serum albumin and of threonine and valine in the globulins is also noteworthy. Alpha-lactalbumin and serum albumin contain relatively large amounts of cystine.

Whey proteins contain a total of 50.9 gm of essential amino acids/100 gm of protein. Whey proteins have a biological value of 104, even higher than whole egg (100) and casein (77) which are taken as control. Because of their biological value, whey proteins raise the nutritional value of diets. The Protein Efficiency Ratio (PER) of whey protein is 2.6 which is higher than casein (2.9) and other proteins except egg proteins (Puranik and Rao, 1996).

PRODUCT DEVELOPMENT FOR ELDERLY — DESIGN CONSIDERATIONS

While designing geriatric foods, factors which need to be considered are summarized in Table 1. There appears to be a necessity for designing and producing easy to prepare, enjoyable foods high in nutrient density and with high hygienic standards targeted at old age consumers. Food industry may be able to meet the challenging task of providing the nutritional needs of elderly people by manufacturing at reasonable cost, a variety of small packs of nutritious, instant and convenience foods, easy to open and store and attractive at

Table 1: Product Development for Elderly — Some Design Considerations

Handicap	Method to Overcome
Poor vision	More colourful presentation of the product.
Poor smell sense	Higher levels of flavour.
Less taste buds	Safe synthetic sweetness to augment normal sugar levels.
Loss of teeth	Softer textured foods
Less secretion of digestive juices	Foods with higher moisture, finer particle size, pre-digested foods.
Frequent constipation	Increased fibre intake through high fibre containing products with lower percentage of coarse particles.
Changes in colon microflora	Use of fructo- and galacto oligosachharides in foods, dairy products.
Reduced fat absorption & resynthesis	Low fat products but with adequate essential fatty acids, increased protein levels.

first sight with appropriate and acceptable flavour, texture and colour. This will enable the elderly to regularly eat healthy and tasty meals besides giving them the much needed psychological satisfaction. Business-wise, the industry will have a substantial profit margin if low-cost ingredients like whey and whey products are used.

WHEY AND WHEY PROTEINS AS INGREDIENTS IN GERIATRIC FOODS

Whey is highly nutritious by-product obtained during cheese/paneer and casein manufacture. It contains more than half the solids present in the whole milk, including 20 per cent of the protein called whey protein and most of the lactose, minerals and water soluble vitamins. India's estimated whey production is 1000 million kgs. and the production is likely to increase with the establishment of commercial dairies by multinational companies.

Table 2: Composition of Some Whey Protein Concentrates (WPC)

Type of WPC	Moisture %	Fat %	Protein %	Lactose %	Ash %
WPC 35	4.60	2.10	36.20	49.30	7.80
WPC 50	4.30	3.70	52.10	33.50	6.40
WPC 65	4.20	5.60	63.00	23.30	3.90
WPC 80	4.00	7.20	81.00	4.70	3.10

Whey protein concentrates (WPCs) are manufactured by the ultrafiltration of whey. In this process, whey is passed against a semi-permeable membrane, which selectively allows passage of low-molecular-weight materials such as water, ions and lactose, whilst retaining higher molecular weight materials such as protein in the 'retentate'. The retentate is then further concentrated by evaporation and spray dried to yield whey protein concentrates. WPCs are generally available commercially with protein contents of 35, 50 and 75 per cent. For the higher protein products, a process known as 'diafiltration' is employed, in which additional water is added to the retentate during manufacture to 'wash out' more of the low-molecular-weight materials from

the retentate. Composition of some whey protein concentrates is presented in Table 2. Whey and whey protein concentrates with their excellent nutritional potential will serve as one of the basic ingredients in geriatric foods.

WHEY BASED BEVERAGES/WHEY DRINKS FOR GERIATRICS

Whey is one of the raw food materials that complies very well with the thesis "Maximum of biological value — minimum of calories". At the present time the above consideration is important when evaluating whey utilization bearing in mind the progressing demand of the nutritionally rich ingredients.

Recipes for Some Whey Drinks for Geriatrics

1. Fermented Fruit Whey Drink

Recipe:	
Sweet or sour whey	80-85%
Fruit concentrate	2.0-7.0%
Sugar	6.0-10.0%
Stabilizer	0.30%
Colour and flavour	As required to 100 %

Technology: Whey is filtered to remove larger cheese particles with a simple mesh followed by dispersion of stabilizer into the whey. Generally a good agitation is required for this purpose. Dry blending the stabilizer with a portion of sugar will generally prevent lump formation. The stabilizer is added for mouthfeel and to prevent coagulated protein from setting. Swelling and harmonization enables the stabilizer to swell, and equally important, to form a protective cover around the protein. To pasteurize the whey and inactivate any remaining cheese starter culture the whey mixture is heated to 85°C. Then cooled to 42°C to inoculate with *Lactobacillus helveticus*. This culturing step converts lactose to lactic acid, reduces the pH naturally and helps to stabilize the product and prevent the growth of pathogenic organisms. The small amount of protein in the whey is converted into amino acids, and cheese notes are eliminated. The culture can also develop some of the vitamins of the B group. The other cultures can be and are used at this stage are B.

bifidum with *Str. thermophilus*, in which case a drink with a higher content of L(+) lactic acid is produced. Generally, the culturing process should be taken to a pH below 4.3. Optimum pH range is 2.8-4.2. Cool and add fruit juice and sugar. In general, the use of pure fruit juices with a health drink is desirable. A second heat treatment inactivates the culture. Coagulated protein tends of coalesce during this secondary heating and therefore high pressure homogenization is vital. Because of the low pH of these drinks, an adequate shelf life can be achieved by heating to 90°C and hot filling above 68°C followed by rapid cooling.

2. Whey Drinks from Whey Powder

Recipe:	
Whey powder(12.5% protein)	5.50%
Crystal sugar	6.20%
Stabilizer	0.20%
Flavour	7.0%
Water	81.80%

Technology: Disperse whey powder in cold water. Dry mix stabilizer with sugar and add to whey mix. Add fruit concentrate. Control pH to 3.6 to 4.2 and hold for 30 minutes. Heat to 90°C, homogenize and hot fill at 75°C and cool.

3. Whey drink from rehydrated whey protein concentrates

Recipe:	
Whey protein concentrates	4-6%
Crystal sugar	6-10%
Stabilizer	0.30%
Juice/flavour system	1-5%
Water	As required to 100%

Technology: Disperse whey protein concentrate into water and allow 2-3 hours to hydrate. Dry blend stabilizer with 2-3 times its weight of sugar and add to this mixture with good agitation. Allow to swell for 30 minutes with gentle agitation. Add 50 per cent citric acid solution, fruit and flavour and remaining sugar to desired pH. Harmonize

for further 30 minutes. Heat to between 95 and 115°C and hold for 4-5 seconds followed by downstream aseptic homogenization with 200 bar, and cold aseptic packing.

4. Medical whey beverage

In Germany, the manufacture of medicinal whey beverages is now commercial. The medicinal whey beverages are in much demand and are sold in shops of medicinal herbs and dietetic products. The whey beverage sells under the brand name "plus". The beverage "plus" has pleasant soft acid taste. It contains more nutrients than the whey based beverage only because of the valuable milk components, that is, whey proteins, lactose, lactic acid (D+ form) favouring metabolism, orotic acid, vitamins and mineral substances. The beverage with whey protein additive contains yoghurt starter cultures which are known of their therapeutic value exactly suitable for geriatrics. This drink has increased potassium content and low sodium content resulting in dehydration of an organism. The composition of whey protein equals to that of blood proteins but the former have high biological value. On an average 100 gm of whey beverage "plus" contains 1.5 gm protein, less than 0.3 gm fat, 4.8 gm lactose, 2 mg of orotic acid, 55 mg sodium, 168 mg potassium and 126 gm of calcium.

5. Fermented whey beverage using whey protein concentrate

Technology: Whey protein concentrate with suitable protein content is to be reconstituted in water as a 10 per cent solution. Heat treat the solution to 80°C for 30 min. and inoculate with *Lactobacillus acidophilus* or *Lactobacillus bifidus* or with the mixture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus*, after adjusting the pH to 6/9. Compared to milk drinks, the resulting whey beverage will have more compact consistency and contains more protein and lactose. The nutritive value of the beverage is quite high compared to milk drink because of free amino acids content and hence has a higher biological value.

Express Foods (USA) manufactures whey protein concentrates as a base for the drinks with 75 and 50 per cent protein content. When dispersed in cold water, the whey protein concentrates contribute to pH stability and are soluble in acid medium with no off-flavours. The above whey

protein concentrates have light aroma and contribute to a minimum viscosity of the solution at the room temperature with a desirable colour. Considering the high biological value of whey protein concentrates, it is reasonable to use them for the enrichment of acid products and drink mixtures which require preliminary hydration prior to their utilization and consumption. These whey protein concentrates are exactly suitable as base ingredients for geriatric whey beverages.

CONCLUSION

In conclusion, utilization of whey proteins for the formulation of geriatric foods represents a promising avenue for product diversification in the dairy/food industry. Whey and whey protein concentrates which have excellent nutritional potential will definitely serve as essential ingredients for geriatrics. Let us hope that in the "International year of the Older Persons", there is substantial contribution from dairy industry to the balanced diets of geriatrics by making use of nutritionally potential whey and whey products.

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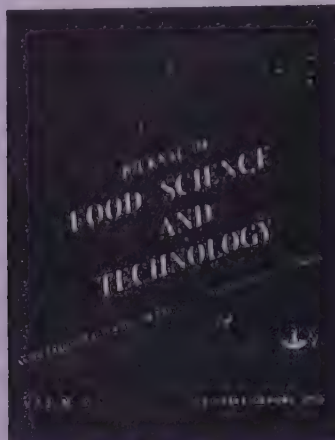
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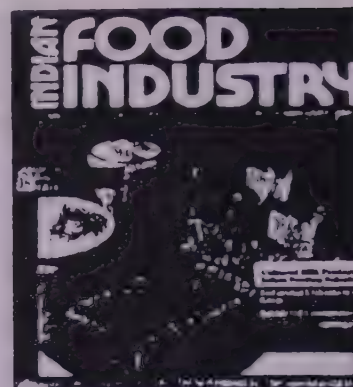
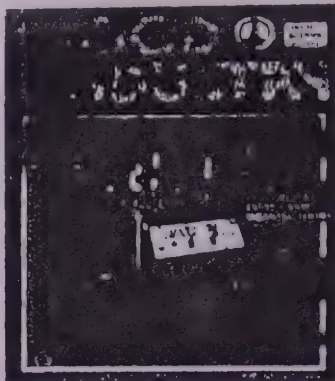
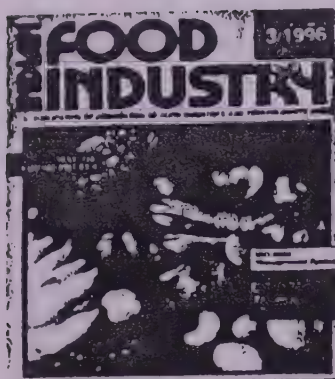
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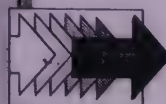
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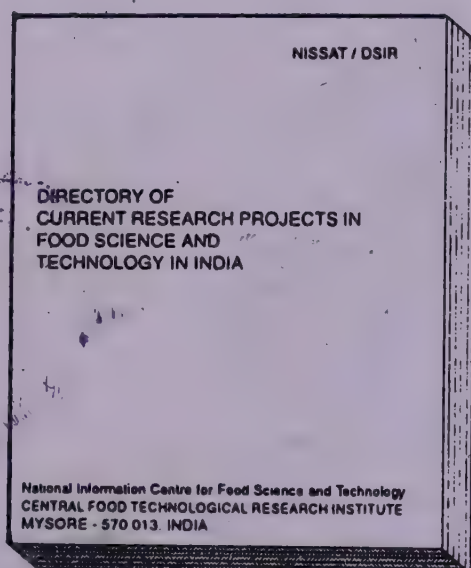
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FOOD DIGEST

**Vol. 22, No. 4
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322 Australia develops new rice strain for Japan market

Australia is aiming to exploit an edge over its international competition for the big Japanese rice market with a new variety of Australian-bred short grain rice. Named 'Opus', the rice is the first Australian-bred short grain variety specifically developed for the Japanese market. It was officially launched by the New South Wales Minister for Agriculture, Mr. Richard Amery here.

"The development gives Australia a unique marketing advantage ahead of international competition", a spokeswoman for Ricegrowers' Cooperative Ltd. said. The new rice variety had the potential to expand Australian exports to Japan substantially, she said. The Japanese market is presently worth more than A\$60 million a year to Australia. Australia exports about 100,000 tonnes of rice a year to Japan, mainly the Japanese variety Koshihikari.

Opus, a cross between Koshihikari and the Australian 'Bogan' variety, was a speciality variety which had well-shaped small grains which were free from chalk and had good colour, said the Ricegrowers' Cooperative Director, Mr. Norm McAllister. Bogan is an Australian medium grain variety while Koshihikari is a short grain Japanese variety famous for its soft cooking characteristics. It is the most favoured variety in Japan.

Opus is a soft cooking rice ideal for Japanese dishes such as Sushi, said Mr. Jurie Lewin, rice breeder at Yanco Agricultural Institute. Around 10,000

tonnes of Opus will be harvested from the NSW rice growing area, centred in the Murray and Murrumbidgee agricultural regions in the southern parts of the State.
(*Business Line*, 9 March 1999, 13)

323 Potato variety for chips

A crash programme on breeding was launched at the Central Potato Research Institute in 1990 and a hybrid MP/91-G was developed. This hybrid has been christened as Kufri Chipsona 2 and has been notified for the Indo-Gangetic plains.

The tuber dry matter and reducing sugar content of potatoes are the two most important parameters in selecting raw materials for processing as these determine the yield, texture and quality of the processed potato products.

The tuber dry matter is known to influence oil uptake during frying as with its increase the oil uptake decreases. The use of this variety will thus economise on oil consumption and improve the quality of the product which will be less greasy and has low calories.

Chip colour is the most important criterion for marketing of the finished product. The chipping industry accepts chip colour in the range of 1 to 3 on a scale of 1-8 (1 being the lightest and 8 the darkest). The results of trials conducted at Modipuram have shown that Kufri Chipsona-2 can be harvested at any time starting from 90 days onwards to give acceptable light colour chips.

(*The Hindu*, 10 June 1999, 24)

324 Pepino – The untapped fruit

Pepino (*Solanum muricatum*), also known as melon pear, has now come to India. It was introduced in Nilgiris of Tamil Nadu in India from Andean region of South America. Pepino is also well known in New Zealand, Italy and Russia. Pepino is a juicy, versatile fruit with a pleasant fresh taste. Ripe fruits are used in desserts while the unripe ones are used in making salad. Presence of pectin makes them specially suitable for preparing jams, syrup and also in ice creams and marmalades.

Pepino can either be picked when completely ripe or some times before reaching this stage. Ripe fruits can be preserved at 20° C to 25° C for more than 15 days without losing the quality. The newly introduced pepino could become an important cash crop for small and marginal farmers with the increasing consumer demand for fruits. Export of fruit juices to Asian countries is yet another potential to opening in international trade. Pepino with multiple possibilities for consumption will have a better preference in the local and export market.

{Science Express, 27 April 1999, 5}

325 West Indian Cherry – a rich source of Vitamin C

West Indian Cherry (*Malpighia glabra* L.) which is one of the richest sources of ascorbic acid (6-8 times more than the recommended dose) is grown well in Andaman and Nicobar islands due to its suitable climate.

The composition of the cherry fruits are as follows:

Ripe fruits	Unripe fruits
Juice(%) 57.81%	54.40%
TSS(B)2.60%	2.80%
Acidity (%C.A) 1.18%	1.28%
Ascorbic acid 4515 (mg/100gm fruit)	3100

The acid fruits are made into preserves like jam, jellies and candies. The juice of this fruit is used commercially to enrich other fruit which are low in vit. C. Since, unripe fruits are equally rich in vitamin "c", they can be used for making other products like pickle etc.

{Agro India, 3(4), 1999, 32}

STORAGE AND INFESTATION CONTROL

326 Carbon dioxide to pasteurize food cheaply

A process that completely pasteurizes liquid food stuffs by using carbon dioxide has been developed by scientists at Kyushu University in Japan. The system consists of carbon dioxide and foodstuff feed pumps, a column reactor with a microbubbling filter with ten-micrometer pores, a pressure and flow rate control valve, a carbon dioxide purge system and a sample receptor.

The bubbler allows a high concentration of carbon dioxide in the liquid which penetrates the contaminating bacilli's cells. On releasing the pressure, the expanding gas bursts the bugs' cell membranes. Soya sauce containing heat-resistant yeast was passed through a 5.8-litre reactor. Complete pasteurization was

achieved after 13 minutes at 35 degrees celsius.

The test facility has a maximum throughput of one litre per minute whereas a commercial unit would be over 100 litres per minute. Although the investment costs for a specialised plant are twice that of conventional thermal treatment process, the payback time is about two years due to the energy saving. Operating costs for the new process are expected to be one-third of conventional thermal treatment.

{PTI Science Service, 18(7), 1999, 10-11}

327 Keeping milk fresh for a month

An agreement to manufacture processing plants utilising the Milk Marque's Extended Shelf Life (ESL) technology was recently signed between Charles Wait (process plant) Ltd. and Milk Marque. The systems are designed using established heat exchange technology, whereby milk is heated to a higher than normal pasteurisation temperature for about one second-long enough to kill most bacteria, but not the taste- and then rapidly cooled. This gives the finished product a shelf life of at least 28 days when stored chilled. ESL plants can now be designed to switch between ESL and UHT, giving the customer greater flexibility at a relatively low cost.

Charles Wait (process plant) Ltd. has the full support of Dr. H. Ranjith, who developed the ESL process, as well as the staff at Milk Marque's Product Development Centre. Commenting on the announcement, Charles Wait, managing director for Charles Wait (process plant), said, "This agreement formalises a working

arrangement which has been developed with Milk Marque's Product Development Centre. By using the latest processing equipment, we offer cost effective solutions for ESL requirements - particularly in niche products such as specialist milks and creams, where keeping the original fresh taste is crucial.

{Asia Pacific Industry, Jan/Feb 1999, 44}

FOOD ADDITIVES

328 Tamarind as colourant

The half-matured red-coloured tamarind fruits can be used for imparting colours to food. The researchers Dr. P. Vennila and Dr. Rose Prabin Kingsly say the tamarind powder is highly soluble in water and lends raspberry red colour to food. Experiments were carried out to extract red pigment (anthocyanin) from the half-matured red-coloured tamarind fruit (variety-red type). The tamarind powder is prepared by drying the fruit pulp in the cabinet drier at 50 degree C till it reaches the moisture content of 5 per cent.

The percentage of recovery and the time taken for drying of the tamarind powder is 25 per cent and seven hours, respectively. The chemical constituents of the tamarind powder are moisture 5.15 per cent, acidity-11.52 per cent, tartaric acid and anthocyanin-1,285 mg/100 gm. The dried and powdered pulp can also be used for imparting colours to the food. The use of red tamarind imparts attractive red colour to rasam, sambar, pulisadam, jam, jelly, etc. Red tamarind has the potential to become a major natural colourant in

food items. There is also ample scope for its use domestically.

(*Business Line*, 9 August 1999, 8)

329 New sources of sweeteners identified

Thirteen new sources of natural non-saccharide sweeteners from various plants, found mostly in the Himalayas, have been identified by scientists at Indian Institute of Sugarcane Research (IISR) in Lucknow. The species contain some super-sweet compounds which are 100 to 10,000 times sweeter than sugar. The plants, found mostly in the Himalayan forests, can provide a new source of non-saccharide sweeteners whose demand in the country is increasing due to rise in diabetic patients.

Currently, India imports non-saccharide sweeteners from Japan, Brazil and USA for its 20 million diabetics. But the demand is expected to rise as the number may reach 35 million by 2003. The plant-derived sweeteners, if cultivated on a large scale, can meet the demand as they do not have any adverse impact on health, a common problem of synthetic sweeteners like saccharin, aspartame and cyclamate, IISR scientist R Snehi Dwivedi.

Saccharin, aspartame and cyclamate which are widely used as a sugar alternative are known cancer-causing agents. These herbal sweeteners can also replace sugar as regular use of sugar can increase prevalence of diseases like dental caries, cardiovascular disease, diabetes mellitus, obesity and micro-nutrients deficiency, he said. The sweeteners have export potential as global requirement for non-saccharide

sweeteners are expected to double by 2030.

(*Economic Times*, 18 August 1999, 18)

330 Crusty bread improver

Kerry SPP has launched Quasar Extra, a bread improver for crusty breads using enzyme and emulsifier technology. Quasar Extra has been specifically designed to ensure all crusty bread products have a high quality, natural crisp crust that cooks well. Specialist continental sourdoughs are used to give a traditional flavour. Quasar Extra is formulated for use in fermented products made on no-time process and provides exceptional dough tolerance and stability, allowing the baker to maximize product quality.

Quasar Extra can be used for all crusty breads and rolls with recommended usage rates from one per cent to two per cent on flour weight depending on the application. For further information contact: Kerry SPP, Station Road, Cambridge CB1 2JN, UK; Tel: +44 1223 460666; Fax: +44 1223 352012.

(*Food Ingredients and Analysis International*, 21(2); 1999; VI)

331 Weight-gain enzyme for poultry

The Chennai-based Textan Chemicals (P) Ltd. (TCPL) has developed an enzyme which gain promotes weight in poultry stock. The Managing Director of TCPL, Mr. R.P. Krishnamachari told that the enzyme called 'phytase' would help poultry stock gain 20 per cent additional weight. The enzyme was undergoing extensive field trials and that the company was in the second stage of testing it. The results of the

initial tests conducted on about 200 birds had shown that after being fed with phytase mixed poultry feed, the birds gained an additional 15 to 20 per cent in terms of weight.

He said the enzyme helped in the better absorption of the feed and the weight gain was in terms of more protein in the body of the chicken. The Mysore-based Central Food Technological Research Institute (CFTRI) has developed a similar enzyme. Textan, which has been spent about Rs. 10 lakhs for the development of the enzyme, hopes to commercialise the production once the second trial is over.

Initially the company is hoping to sell around 300 kg of the phytase enzyme. The enzyme, in the powder form, is expected to cost between Rs. 175 and Rs. 200 per kg. Optimally, 10 kg of the enzyme will have to be mixed with one tonne of poultry feed. Textan has facilities to produce about 500 kg of the phytase enzyme per year.

{Business Line, 9 June 1999, 8}

332 Nu-Rice Emulsifier

Ribus' Nu-Rice emulsifier has proved to be a good extrusion (and sheeting) processing aid and an alternative to traditional emulsifiers, monoglycerides and lecithin. This 100% natural (non genetically manipulated organism) ingredient can be used in cereals, snacks, paste, pellets and sheeted goods.

This product improves extrusion throughput (lubrication, barrel coating and dough conditioning), reduces stickiness, provides expansion control, enhancements to texture, shape and flavour. Unlike other processing aids, it

does not have a negative impact on bulk density as use rates increase.

{Food Trade Review, 65(1), 1999, 60}

PROCESSES

333 Safe and quick method for sterilising bottles developed

Researchers at the Jenton International (JenAct) Ltd., Hampshire, UK have developed a system which makes sterilising bottles safer and quicker. The system involves transmitting microwaves through the side of a bottle to energise an electrodeless UV-emitting bulb inside the bottle.

There are no restrictions placed on the bulb design by electrodes (as in conventional fluorescent germicidal UV tubes) and the bulbs can operate as low, medium or high-pressure bulbs. As there are no electrodes, bulb life is extended almost indefinitely and in test. JenAct has never had a bulb fail. So far sterilisation was being done by steam or chemical methods which were time-consuming, requiring much energy and chemically hazardous.

The company has financed a project at the University of Southampton, Southern England, to investigate bulb fill possibilities and output characteristics with various fill elements. Several possibilities suited to many different applications are emerging. Smart funding promotes innovation in smaller companies (up to 50 full-time employees) where grants of up to 45,000 are awarded for feasibility studies on technology-based projects.

For further details contact: Jenton International (JenAct) Ltd., 9 Ardglenn

Industrial Estate, Evingar Road,
Whitchurch, Hampshire, U.K. RG28
7BB;

*{Journal of Scientific and Industrial
Research, 58(6), 1999, 468}*

334 Microfiltration of cheese brine

Cross-flow microfiltration has been proved a perfect solution for controlling the quality of cheese brine. The chemical and microbiological quality of brine used for salting of cheese is important for production of high-quality cheeses, it is commonly accepted among cheese makers that optimal composition and other characteristics of the brine are very important to the development of flavour and other important properties in the cheese. The brine may, however, contain unwanted microorganisms such as gas-producing lactobacilli, pigment producing micrococci, pathogenic bacteria (listeria, staphylococci and others) yeast and mould.

Taking the pros & cons into account, a spiral-wound system is clearly to be recommended; to a large extent due to the lower demands for pre-filtration and related costs of frequent change of pre-filters, cleaning of pre-filters, and the labour involved in this. The difference in membrane tolerance to chemicals and temperature is without any practical importance as cleaning is relatively simple. Microfiltration removes microorganisms, dead cells and physical contaminants from the brine without changing the brine's chemical composition. As a side effect of the purification of the brine, the time necessary for salting may be reduced considerably.

{Indian Dairyman, 51(5); 1999; 49}

335 Carrot juice extraction

Enzyme specialist, Biocatalysts Ltd., has now produced an enzyme for the production of cloud stable carrot juice concentrate which it claims will increase the yield by 20%-60%, and facilitate extraction by decanters, as well as ensure quick maceration and viscosity reduction.

Its application is as follows: the carrots are ground after cleaning and peeling and blanched as quickly as possible to prevent enzymatic browning. One option is to use direct steam injection for rapid heating. Acid is added at the grinding or heating stage to bring the pH to about 5-5.2 for optimum Depol 40L reaction and to prevent colour degradation. Water can also be added at this stage. According to the manufacturer, 200-500ppm Depol 40L added will yield about 50-70 kg of juice solids in the finished concentrate per tonne of raw carrots processed, compared with 35-45kg of solids without enzymes.

{Food Manufacture, April 1999, 23}

336 The new art of frying

The major breakthrough has been achieved in reducing the fat content in deep fried foods. The process makes food light and easily digestible. It also helps in reducing obesity, high blood pressure, arthritis and maintain low levels of cholesterol. A process patent which can reduce 50% oil fat absorption in deep fat fried foods is pending with the National Research Development Corporation (Govt. of India), New Delhi. In advanced countries, fat substitutes like Olestra, Dialkyl-di-hexa-decay Malonate (DDM), Esterified Propoxylated Glycerol (EPG) and Tri-al

koxy-tri-carvally ate (TATCA) are being tried out for this purpose.

In the new process a natural additive which is obtained from fruits helps in reduction of oil absorption. The material or substance which require deep frying should be dipped in this natural additive first and then fried. This brings about 50% or more reduction in oil absorption. The technology is down- to- earth and costs very less.

(Science Express, 31 August 1999, 1)

BY PRODUCTS AND WASTE UTILIZATION

337 Recycling plant residues

U.K. Scientists have developed a recycling process that can be used for converting plant residues into construction boards and for making brick. The process involves collecting the waste material in a tank with an agent to bring together the fine particles of the solution to form flocs. While the fibre-rich streams are collected separately and used for board making the sludge left behind can be used for brick making. The brick, made out of left-over sludge, has better pore structure giving it improved frost resistance. The sludge can be used as an additive in plasterboards.

(The Hindu, 24 June 1999, 21)

338 Power from rice husk

The process involves alternately burning and cooling the husks to release a flammable gas that is then burned to turn generator turbines, Xinhua news agency said. The scientists in Fuzhou city, 1,700 km South of Beijing, said they had used the

process to create electricity in a laboratory.

(Business Line, 9 April 1999, 13)

339 Protecting chickens from salmonella starts with the egg

A simple three-step process can help poultry producers keep Salmonella and other food pathogens out of poultry and may increase profits. It all begins with the egg, according to scientists at the Agricultural Research Service.

"Three simple steps will reduce the Salmonella threat for egg. hatching and poultry-production operations," said ARS microbiologist Mark Berrang. "The steps involve cleaning the eggs, treating chicks with a safe spray and using beneficial microbes to protect growing birds."

"Taking these measures can also net higher prices for those who produce fertile eggs for meat production," said Berrang.

(Dairy, Food and Environmental Sanitation, February 1999, 114)

PROCESSED PRODUCTS

340 Natural health food launched

Mysore-based Mistura Health Foods has launched a 100 per cent natural health food. Touted as a supplementary, nutritious food. It will have a beneficial effect on diabetics and those suffering from high blood pressure, according to Mr. Sudhakar Rao, Managing Director of the company.

The products, Mistura Mylant and Mistura Mascots, are protein-rich

and can be used by all age groups. The former is available in a variety of flavours like dry fruits, almonds and chocolate, while Mascot is sugar-free. The high-fibre content; helps to reduce cholesterol and control sugar. Further, these products can be consumed as a drink or added in conventional preparations like chapathis, parathas and traditional sweets.

(Business Line, 1 May 1999, 6)

341 Enriched soya bean drink from Yeo's

Introduced as an alternative to fresh soya milk, Yeo's Original Soya Milk is positioned as a milk product, unlike most other soya bean drinks which are already in the market. Choosing the transparent PET bottle over the conventional carton, the latest product from Yeo's is manufactured in Guangzhou, China.

Original Soya Milk is available in handy 300-ml and the family 1-litre bottles. A concoction of water, aqueous extract of soybean, vitamin E, emulsifier and cane sugar, each 100-ml of the product consists of 70 kcal, 3 grams of protein, 2.5 grams of fat and 9.1 gram of carbohydrates. It contains absolutely zero cholesterol, lactose and preservatives.

(Asia Pacific Food Industry, Jan/Feb 1999, 71)

342 Calcium milk

Farmhouse is now ready to grab the attention of shoppers again with its colourful low fat, high calcium fresh milk after redesigning its package in an eye-catching fashion. While the original milk product uses striking pink background, the new one uses a friendly green colour. When placed together side

by side, the two Farmhouse products certainly liven up the milk shelves.

Containing 52 percent less fat and 50 percent more calcium when in comparison to regular milk, each 250-ml glass of Farmhouse low fat, high calcium milk provides 120.5 kcal., 8 grams of protein and 4.5 gram of fat. Farmhouse is an Australian brand, but is packed by Asia Dairies for sale in Singapore, and F&N Dairies in Selangor for Malaysia. Each 1-litre pack cost about US\$1.35.

(Asia Pacific Food Industry, Jan/Feb 1999, 73)

343 Cool scoop for the heat

Karnataka Milk Federation (KMF) has launched its Icecream under the 'Nandini' brand name. KMF manufactures the icecream at its Mother Dairy Plant at Yelahanka near Bangalore with the present estimated to be 3,000 litres. The machinery at the plant is Indian and the technology to produce the icecream has been provided by the National Dairy Development Board.

The icecream will be marketed through KMF's 400 bulk vending booths, agents who have refrigeration facilities and parlours. But this will be done in a phased manner. To begin with, Bangalore, along with district and urban taluk headquarters will retail the icecream. KMF hopes to cover all cities in Karnataka in two years. The KMF icecream will be priced "more or less like Amul," according to Mr. Chenna Gowda. The cups, cones and candies will come in 14 flavours, which will be later increased to 17 flavours.

(Deccan Herald, 22 March 1999, 21)

344 **Delipidized whey protein concentrate using membrane processing**

A study was carried out by National Dairy Research Institute (NDRI), with the objective of determining the effect of microfiltration of whey on the functional properties of whey protein concentrates (WPC). The delipidized WPC solutions (5.0, 7.5 and 15.0% protein) had lower apparent viscosity than undelipidized WPC solutions. Power law parameters indicated that the overall apparent viscosity increased while Newtonian character decreased in general, with the increasing protein level, the effect being much more pronounced in case of undelipidized products. Also, the delipidized WPC had appreciably lower bulk density and greater wettability than the undelipidized WPC. Foaming characteristics of WPC were found to improve significantly upon delipidization. A 100% higher foam volume was attained in delipidized WPC as compared to that in the undelipidized one. The foam stability was nearly similar in both types of WPC. In view of the above findings, it could be concluded that microfiltration can be successfully used as pretreatment of whey for the manufacture of delipidized WPC. The final product by virtue of decreased fat content, has improved foaming and whipping properties, lower viscosity and greater wettability.

(Indian Dairyman, 51(5), 1999, 49)

345 **ProViva 'functional' fruit drink**

ProViva is an oatmeal-based fruit drink rich in bacteria that will help to restore the natural balance to

the gastro-intestinal system, say the makers, Skane Dairy UK Ltd.

ProViva is the world's first non dairy probiotic drink and is already a best-seller in Sweden where it was developed by the research company Probi AB in association with Skane Dairy.

In fact, so strong is the evidence behind ProViva and the *Lactobacillus plantarum* 299v bacteria, which it contains, that it seems likely to become the first officially approved functional food product in an EU country when Sweden permits health claims.

This product was developed to help patients overcome the problems associated with loss of bacteria in the stomach following with antibiotics or during drip-feeding. Available in two flavours – strawberry and blackcurrant, ProViva contains a mixture of fresh fruit juice and fermented oats rich in Lp299v.

(Food Trade Review, 69(3), 1999, 189)

346 **Relish a glass of low sodium juice drink**

V8 Splash, a delicious refreshing nutritious drink comes in two blends: Berry Blend and Strawberry Kiwi. Berry Blend is a blend of strawberry, raspberry and blackberry, with just the right amount of luscious cherry and sunny sweet carrot. Strawberry Kiwi is a concoction of kiwi fruit, strawberry and carrot. The naturally flavoured beverages contain no artificial flavours and are exceptionally low in sodium. It is rich in beta carotene, and exceeds the RDA of vitamins A and C – two vital substances for good vision, healthy skin, bones, gums and teeth.

Each 240 ml serving size provides 110 calories, zero fat, 25 mg of sodium, 180 mg of potassium, and 28g of carbohydrates/sugar. V8 Splash contains 25 percent juice and is available in a glass bottle of 473 ml.

{Asia Pacific Food Industry, 11(4), 1999, 75}

347 Kawal – a traditional fermented product from Sudan

Kawal, a strong smelling Sudanese, protein-rich food, is prepared by fermenting the leaves of a wild African legume, *Cassia obtusifolia*. It is usually cooked in stews and soups and used as a meat replacer or a meat extender. The Sickie Pod plant (*Cassia obtusifolia*) is a wild legume that grows in Sudan. The leaves should be collected late in the rainy season when the plant is fully grown. All the stems, pods and flowers should be removed.

If they are not removed, the final product is bitter. The leaves should not be washed. It is thought that natural micro-organisms on the leaves are important for the correct fermentation. The leaves of the leguminous plant are pounded into paste without releasing the juice. The paste is placed in an earware jar and covered with sorghum leaves. The whole jar is sealed with mud and buried in the ground up to the neck in a cool place. Every three days the contents are mixed by hand.

The fermentation takes about fourteen days. The fermentation is extremely complex. The main micro-organisms are *Bacillus subtilis* and *Propionibacterium* spp. Lactic acid bacteria including *Lactobacillus plantarum*, yeasts including *Candida krusei* and *Saccharomyces* spp and moulds including *Rhizopus* spp are also

involved. After about fourteen days, the strongly smelling black fermented paste is made into small balls and sun-dried for five days.

{Intermediate Technology Food Chain, 23 July 1998, 6}

348 Gundruk – a traditional Nepalese fermented food

Gundruk is made from fermented leafy vegetables. It is very popular in Nepal, where it forms part of the daily diet, consumed as a side dish with the main meal and an appetiser. Fresh leaves are harvested and allowed to wilt for one or two days, after which time they are shredded with a knife or sickle. The shredded leaves are tightly packed in an earware pot and warm water (at about 30° C) is added to cover all the leaves. The pot is then kept in a warm place (about 18° C) for between five and seven days. The product is tasted – a mild acidic taste indicates the end of fermentation – and the gundruk is removed and sun-dried.

The bacteria responsible for the fermentation are predominantly *Pedococcus* and *Lactobacillus* species. During fermentation, the pH drops slowly to a final value of 4.0 and the amount of acid (as lactic) increases to about 1% on the sixth day. One of the disadvantages of the traditional process of gundruk fermentation is the loss of 90% of the carotenoids, probably during sundrying. Improved methods of drying might reduce the vitamin loss. The dried product can be stored in airtight containers for several months.

{Intermediate Technology Food Chain, 23 July 1998, 7}

349 New heat-activated leavener

Leverage, the first new heat-activated leavener in 30 years is launched in Europe. Its balance of properties offers technologists a new tool with which to formulate baked goods. These properties include excellent bench tolerance, vital for frozen or refrigerated dough and important for overcoming time restrictions in preparation, a consistency in leavening that eliminates tunnels or large air bubbles giving a uniform cell structure, and an improved moistness well suited to reduced or low-fat applications.

For further information contact:
Honeywill & Stein Ltd., Times House
Throwley Way, Sutton, Surrey
SM1 4AF, UK
{*Food Ingredients and Analysis International*, 21(2), 1999, VIII]

350 Baked chips from Lay's

Snack lovers can perhaps feel a little less guilty if they reach out for the newly launched potato chips from Lay's. It is baked, not fried. It contains less oil, less salt, and less fats. A serving of 28 gram of the baked chips contains 120 calories, of which 25 calories are from fat. Made from dehydrated potatoes, corn oil, modified food starch, egg, yoke, whey, yeast extract and barley malt flour, the product contains 2 percent vitamin C, 2 percent iron and 4 percent calcium.

The flavours include original and barbecue. The latter is made with KC Masterpiece barbecue sauce which contains special blends of garlic, sweet molasses, a twinge of tangy onion and other tasty spices. For the weight conscious consumer, it may be worth

noting that a 1-oz serving of Original Baked Lay's has 1.5 grams of fats, while the same amount of barbecue flavour has 3 grams of fats.

{*Asia Pacific Food Industry*, 11(3), 1999, 82}

351 Gravy granules

Green's Foods is the first in Australia to introduce gravy in granule form. This is the first significant product improvement in the \$51.8 million gravy and pour over sauce market in Australia since the introduction of instant powder. Green's Gravy Granules dissolve instantly in boiling water, eliminating the formation of lumps and promising rich, smooth gravy every time.

The gravy market in Australia has been fairly dormant for several years but Green's has taken innovative steps to expand the breadth of product in the local market. Capitalising on the success of the granule product in the UK, Green's Foods are optimistic that the product will be as readily accepted in the Australian market.

The initial marketing initiative has been the sampling of 100,000 gravy using households. Post research conducted with these households discovered that 70% had switched to gravy granules and a further 22% stated an intention to do so.

Green's Gravy Granules come in chicken and roast meat flavours. They are packaged in canisters made of high quality composite, with a resealable plastic lid and a tamper-free protective seal.

{*Food Australia*, 51(5), 1999, 192}

352 Ice teas in new age flavours

Two giant companies, Nestle and Boh Plantations have just launched their versions of the beverage on Asian markets.

Nestle's ice tea, known as Nestea, comes in a slim 240-ml can. Looking cool and upbeat, the young and trendy consumers can choose from its two refreshing flavours of either lemon or tropical fruit. Costing only US\$0.37 a can, Nestea is a break-away from the confectionery line which Nestle is well-known for.

Boh, on the other hand, well-known for its tea-bag products in Singapore and Malaysia has chosen ice tea sachets instead. In flavours of lemon-lime, orchard splash, or peach, this product should suit those who prefer a light weight sachet rather than canned or bottled ice tea drinks. To consume, all it requires is a glass of cold water. Each sachet, which can be mixed into a 200-ml drink, is said to contain 20 mg of Vitamin C, or two-third of the recommended daily allowance for an adult.

(Asia Pacific Food Industry, Jan./Feb. 1999, 71)

353 Concentrated beer powder

Butter Buds Food Ingredients announces Beer Buds, a new concept in bakery ingredients. Beer Buds is a spray dried beer product that provides true beer flavour in a variety of bakery applications. Beer flavour with its combination of sweet, yeasty and fermented notes is growing in popularity. Beer Buds provides a beer flavour well suited to speciality breads and biscuits. Only a small amount of Butter Buds is required to yield the

flavour and other desired attributes of dairy, such as richness, mouthfeel and enhanced flavour. Bakery applications include biscuits, croissants, Madeira (sponge) cake, chocolate cake, cheese cake, muffins, bread, crackers, frosting/icings and fillings.

(Food Ingredients and Analysis International, 21(2), 1999, VIII)

354 Complete meals for the busy consumer

ConAgra Frozen Foods' Marie Callender's brand is introducing "Skillet Meals," for the time-pressed consumer. Now consumers can enjoy Marie's time-tested recipes made to cook in a skillet in less than 20 minutes. Each of Marie's Complete Skillet Meals and Side Dishes are prepared with the freshest meats and vegetables which are flash frozen to seal in the goodness. So when cooking up Marie's Complete Skillet Meals and Side Dishes, the consumer gets only the crunchiest garden vegetables and the most tender and juicy meat and poultry.

Most of the meals are packaged in a unique tub carton called a 'scround'. This allows the consumer the option of using only single portions and provides a convenient storage container for leftovers. In addition to the sealed outside carton, the contents are protected by an internal resealable plastic bag. The full Marie Callender's line includes eight complete skillet meals of 22-25 ounces which serves two people, three family size meals of 35-40 ounces which have from two or four servings.

(Food Production/Management, 121(10), 1999, 8)

EQUIPMENT AND MACHINERY

355 Low-cost juice pasteuriser

Tetra Pak are currently introducing a low-cost price pasteuriser, which costs about 30° C less than their standard model. The new Tetra Therm Aseptic Drink CAB is based on the plate heat exchanger. ClipLine Aseptic Basic (CAB), and has been introduced to meet the demand for a simpler machine. It is suitable for pasteurizing standard fruit juices and juice drinks at under 100° C with fibres/cells less than 1mm long, and is available in two sizes; capable of handling 1500 to 4000 litres an hour and 4000 to 8000 litres.

If de-aeration is required, this new unit can be used in conjunction with their Tetra Alrox Drink basic. It can be used to fill product aseptically into Tetra Brik Aseptic cartons or cold-fill into Tetra Rex cartons, say Tetra Pak Ltd. of 1 Longwalk Road, Stockley Park, Uxbridge, Middlesex, tel. 0189999 586 8000.

(Food Trade Review, 68(11), 1998, 741)

356 PKC steaming ahead in food processing with complete lines as well as peelers

PKC GmbH, Germany has extended steam-peeling to products like frozen potatoes, carrots, apples, apricots and almonds, etc., but it can now deliver entire processing lines – for example, for the production of french fries or processing of fruits and vegetables as well. Gerstmann cited the following advantages for PKC steam peelers: Optimum peeling with minimum loss; free infeed opening for quick filling and emptying; Optimum adaptation to product by steam regulation; optimal

venting system (patented two-phase steam injection procedure); short cycle times; closing of vessel by pneumatic cylinder; mechanical supported opening; electric control by free programmable computer; modular system (single, twin and triple units); volume of vessel from 45 liters to 1500 liters; and capacity of 250 kg/hour to 42,000 kg/hour.

For further information, contact PKC GmbH Maschinen-und Anlagenbau, Buchenweg 3, D-57632 Seifen, Germany.

(Quick Frozen Foods International, 40(4), 1999, 12)

357 Fruit and vegetable puree extraction equipment

The Bertocchi EOS enzyme inactivation and brix control system integrates the patented Bertocchi CX machines for extraction of puree and sauce. Whole fruit is fed to the system. Pulp is extracted and immediately brought to inactivation temperature. A brix control system is integrated into the deaerator to maintain consistency of final product as raw product changes.

VR Food Equipment also has available a Pilot Aseptic Filler. This is the smallest and most compact aseptic filler for 1 to 25 LT. Sterile flexible bags, bag in box type. It has been designed for laboratory pilot applications and for sterile sample taking on aseptic industrial plants. The machine has wheels and can be easily transferred from one place to another.

The unit is available with 2" version filling value for products with pieces and/or 1" version for liquid products, dense, and viscous; with sterile chamber in the hot version (with

steam) and/or cold version (with disinfectant) and also for low acid products (dairy type products).

{*Food Production Management*, 121(9), 1999, 15}

358 Baking ovens

Admir Enterprises are manufacturers of all types and any size of Diesel fired automatic biscuit & bread baking conveyerised ovens, which are designed to run indirect (for biscuit, rusk toast) baking tin metal printing, barrel and pan masala drying ovens, etc. The indirect diesel fired ovens are specially suited for all varieties of biscuit, bread and rusk (toast). These ovens are most efficient in terms of baking performance and fuel consumption. The temperature profile for each variety of biscuits, bread, rusks (toasts) Baking is automatically maintained as per the requirement.

For further details, contact: Admir Enterprises Plot No. 1/E-4 Shivaji Nagar, Govandi, Mumbai 400043
email: admir@bom5.vsnl.net.in
{*Beverage and Food World*, 26(2), 1999, 105}

359 High pressure processor for meat

For the first time ever, a high pressure (HP) cold pasteurizer is being used for the industrial production of meat products. The installation, delivered by Alstom this year to Spanish company Espuna, has a production rate of about 600 kg/hour of sliced ham in flexible pouches. After treatment, the ham has a shelf life of 60 days in the cold chain and retains the organoleptic qualities of freshly sliced ham. Without HP processing, the ham

would keep for three weeks in refrigerated storage.

Food that have already been successfully treated on a commercial scale by HP processing are fruit juices in Europe, a guacamole in the US and a range of products in Japan including fish, rice cakes and fruit juices.

"The Hyperbar pasteurizers offer safety, easy operation and allow a light cold pasteurization, which does not affect the sensorial and nutritional qualities of the products and which significantly increases shelf life," said Jean-Marie Lebas of Alstom. "Because the operation is done directly in the final packaging, this assures perfect food safety and avoids the filling in ultra clean or aseptic conditions."

For further information contact: GEC Alstom, Nantes, France.
{*Food Engineering International*, December 1998, 26}

360 Packaged water chiller

True chilled water is a vital requirement in every modern plant. In industrial processes it makes a lot of sense to use chilled water rather than use of other inefficient modes of cooling like normal water, fan cooling, cooling tower. It is well established that true chilled water increases productivity and quality of finished products and overall efficiency of the plant. Packaged chilling units, supply a ready source of true chilled water at close tolerances for wide variety of applications. Truchill range of packaged water chillers are designed specifically to meet the water chilling requirements of the modern industry with high productivity and high quality demands. They are manufactured in modern and

sophisticated factory with completely standardised manufacturing programme. Every product is fully-engineered, fully-factory built, fully factory tested. Ready to be installed and put to use. The company has incorporated quality management system for in-process and finished product quality. The range has been designed so as to achieve optimum performance under variable load conditions thus assuring maximum coefficient of performance for the refrigeration system and longer operating life.

For more details write to: Premier refrigeration Ltd., 1 Akurli Industrial Estate, Akurli Road, Kandivli (East) Mumbai 400 101
(*Chemical Products Finder*, 17(9), 1999, 89)

361 Mini-vac conveyors

The new Hapman Mini-Vac is designed to efficiently convey a spectrum of products in the food, chemical, pharmaceutical, plastics and other process industries. This conveyor is compact, modular design, easy to clean, convenient access to filters, economical to operate, and easy to install. Hapman pioneered the use of cartridge filter technology in pneumatic material handling. This technology allowed Hapman to introduce a complete line of ultra compact receivers which can handle virtually any material down to 40 micron in size without product lose or filter blow-through. The Mini-Vac is applied in nearly every area of processing plants: storage silos and bins, blenders, mixers, batching systems and others. The Mini-Vac systems are powered by regenerative or positive displacement blowers. Vacuum is applied to the conveying tubes and

filter/receiver inducing airflow. Powders, granules or other materials are drawn into the pick-up device, conveyed smoothly through the conveyor tubing and collected inside the filter receiver. The receiver can be hopper mounted or suspended over storage bins or process equipment.

For more details write to: Hapman Conveyors 6002 E Kilgore Rd., PO Box 2321, Kalamazoo, Michigan 49003, USA
(*Chemical Products Finder*, 17(10), 1999, 8)

362 Plate Heat Exchangers (PHE)

Goma Engineering supplies plate heat exchangers (PHE) which are compact, economical and efficient units used for liquid/liquid heat transfer. It is proven to be a flexible unit having high rate of heat transfer. Goma PHE is made under technical collaboration with GEA-AHLBORN GmbH of Germany who enjoy an excellent reputation throughout the world. GEA-AHLBORN are the largest manufacturers of heat exchangers plates in the world.

Plate Heat Exchanger consists of a frame in which independent metal plates are clamped between a head and a follower. The plates are sealed at their outer edges and around the ports by gaskets. Alternate pairs are connected via ports forming two separate flow systems. Heat transfer between the two media streams, often in counter flow, occurs through the plate as a result of temperature differences between the liquids on the plate surface.

Plates have integral hanging eye enabling smooth movement along the carrying beam and providing perfect

alignment. Increase in capacity possible with the same frame the Loc-in gasket is held by a pressure stud system. This makes easy replacement of the gaskets and the plates are free of adhesive; Goma PHE is economical, compact and flexible unit as compared to conventional heat exchangers; Low hold-up liquid volume thereby giving quick process time; Ease of maintenance; Quick dismantling and re-assemble possible; Loc-in type gaskets, make replacements easy and plates free from adhesives; Easily expandable for higher capacities; Intermixing of liquid eliminated; and Higher regeneration efficiency.

Applications of PHE are in dairy industry (Pasteurizing milk and cream, ultra-high heat treatment, cooling milk and cream, heat treat yoghurt, cooling yoghurt, ice cream milk); Food and Delicatessen industry (Heating and cooling sauces, heating and cooling fat and oil); Brewing Industry; Cooling freshly brewed beer, beer chilling, beer pasteurising; and Beverage Industry (Cooling and heating of: Fruit and vegetable mashes, fruit and vegetable purees, beverage water, fibrous juices).

For further details, contact:
Goma Engineering Pvt.Ltd. Majiwade,
Behind Universal Petrol Pump, Thane
400601,Mumbai;
email:goma@fitwell.wiprobt.ems.vsnl.
net.in

*(Beverage and Food World, 26(2),
1999,123)*

363 Self cleaning filters

Russell Eco Self Cleaning filters are engineered to the highest standards to provide effective processing of a wide variety of products including all types of liquid chocolate, emulsions,

suspensions, coatings, paints, inks, resins, glues, dispersions, water filtration and many other applications. They are compact and fit easily into existing production lines.

The original On-Line design, incorporates a unique cylindrical self-cleaning micro screen, which facilitates high volume production and minimises product loss. Product enters the unit at the top under pressure, passes through the inside of the microscreen to the outside then exits at the bottom. This eliminates any dead spots. On-Line Russel Eco Self Cleaning Filters provide far higher flow rates and greater accuracy than is possible with conventional designs.

The new in-line models are constructed in 316L stainless steel and supplied with either the unique Russell microscreen or a wedge wire screen. Marketed at an exceptionally competitive price for a high specification unit, the latter configuration is particularly well matched to high volume applications. In-Line Russell Eco Self Cleaning Filters are easy to install into existing pipework without the need for a specialist pipe fitter. Horizontal Russel Self Cleaning Filters are exceptionally compact and the ideal choice for production lines where headroom is limited.

For more details, contact: Russell Finex Limited Russell House, Browells Lane, Fletham, Middlesex TW13 7EW, U.K. Email: sales@russellfinex.com
(Beverage and Food World, 26(2), 1999, 104)

364 Aseptic mini-filler

Southcorp Packaging has launched the Intasept™ 16 Mini Filler for the Australian, New Zealand and Asian markets. "It is ideal for research and development facilities, or as a means of inline, aseptic sampling for process and filler validation," said Dennis O'Bryan, Marketing manager, Southcorp Packaging Liquid Bag Systems.

The filler can handle low and high acid products including dairy, coconut, soya, coffee, tea, custard, fish soup, fruit juice, gravies, purees, sauces, etc. It boasts a compact design to make maximum use of available space. An Australian developed product, Intasept™ was the first closed transfer, active sterilisation aseptic packaging system for bag-in-box formats when launched in 1983. Today, it has become the most successful aseptic applications in both the Asian Pacific and worldwide. A key to its success is the double membrane technology and active transfer principle. The interface between the bag filling port/closure and the filling machine is positively steam sterilised for every individual bag. Product transfer integrity is assured as the sterile product does not come into contact with a surface or air space that is not sterilised.

{Food Australia, 51(5), 1999, 196}

365 Liquid filling machines

H.P. Industries manufacture a range of Special Purpose Machine. Among the filling Machines manufactured by H.P. Industries is the Automatic liquid filling machine which is used to fill liquid and pastes. The machine is automatic with high speed extreme accuracy. It accepts any container and is simple to operate. It

works independently of human error and fatigue.

H.P. Industries filling machines are Rotary Gravity fillers with high flow rate value and capping heads. They are fully automatic machines designed for filling plastic, glass or metal containers ranging in sizes from 100 ml to 22 litres. The fillers feature stainless steel construction to handle hot or cold liquids and to maintain machine integrity even in repetitive high volume filling.

This machine can give an output of 25 bottles per minute to 150 bottles per minute. The main advantage of the filling machine is its easy clean-up facility. The machine is most suitable for filling mineral water, milk, juices, oil, cream and other flowable liquids. The machines not only fill containers but also sorts or carries them to and from the filler. It can be taken on a conveyor to one end of the line and has other features such as rinsing, labelling and coding, etc.

For more details, contact: H.P. Industries, 2 Joquim Cottage Vazir Glass Works Rd., J.B. Nagar, Opp. Tata Infotech Ltd., Andheri (East)

Mumbai - 400 059

{Beverage and Food World, 26(2), 1999, 101}

366 Flow-meter filling

Remy of Sidel group have developed flow meter filling machines for filling sensitive products (milk and dairy products, fruit juices, teas, isotonic drinks, etc.). The machines can fill glass, HDPE and PET bottles at the rate of 5000 to 30,000 bottles per hour.

The flow meter process offers the advantage of cleanliness (cleaning and

sterilisation by an automatic collection) and flexibility (volume, changes are quick and from keypad).

For more details, contact: SIDEL
Av. De la Patrouille de France
Octeville-sur-mer B.P. 204-76053 Le
Havre Cedex
(*Packaging India*, 31(6), 1999, 85)

367 Rinse-fill-seal machine (VP 24)

A machine has been designed and manufactured by Venus Packaging Services, pioneer in manufacturing special purpose packaging machines, since 1982. This is a fully automatic machine for bottling of mineral water into PVC/PET bottles. Output capacity 24 BPM, of one litre bottle size. The rinsing-filling and capping operations are fully automatic while empty bottle loading and filled bottle unloading are manual. It is a monoblock with all three operations taking place on a single platform, within an enclosed filling chamber. Caps are fed to the machine by an automatic cap elevator, which after orienting the caps, feed them at the desired rate. The machine does not require any grouting and can be accommodated in a filling room of size (15' x 12' x 10'). The machine has all contact parts made of SS 304 and is complete with conveyor systems for bottle handling. Shrink funnel conveyor for sleeves and body labels can also be provided with the machine.

For more details, contact: Venus Packaging Services 302, Palm Beach, Versova Mumbai – 400 081
(*Beverage and Food World*, 26(2), 1999, 108)

368 Drinking water/reverse osmosis systems

Komal combines the resources of the two leaders in high purity water. Osmonic Inc. USA the world leader in membrane technology and Komal Industries, pioneer in Water treatment Plants in India. Komal manufactures off-the-shelf Reverse Osmosis (RO) System both for Industry and to produce high purity drinking water for domestic purpose. Reverse Osmosis provides the ultimate in pure water requirement for drinking water. It reduces the salts and eliminates organic, bacteria, virus and pyrogen. R.O. System can effectively be employed for reducing salt content of highly saline brackish water into drinking water. Plants are pre-assembled and are ready to connect.

Standard sizes are available from 30 lits./hr. to 1000 lits./hr to produce excellent quality of drinking water. Trouble free, quiet operation and easy maintenance makes Komal R.O. Systems a first choice. Other advantages include: pre-assembled at factory for ready to operate, minimal, if any, pre-treatment required, wide range of membranes are available for different applications.

For further details, contact: Komal Industries 307, Goradia House 104, Kazi Sayed St., Mumbai-400 003. email: kcc@giasbm01.vsnl.net.in
(*Beverage and Food World*, 26(2), 1999, 121)

369 Water Disinfection Systems

Hitech Ultraviolet Water Disinfection System provides a cost effective, simple solution to fluid quality problems. With Hitech UV patented

Teflon based system, fluid flows through Teflon tubes with germicidal UV Lamps placed outside the tubes. Ultraviolet rays pass through the UV Transmitting Teflon tubes into the fluid and disinfects it.

The advantage is that: process does not change pH taste odour or chemical composition of fluid being disinfected; a minimum of 99.9% + micro-organism "Kill" is achieved; non-wetting Teflon eliminates fouling and thus the need for wiping and constant cleaning is avoided; complete separation of fluid and electrical circuits, resulting in improved reliability and safety; simple to install, operate and maintain; simpler, safer and cheaper than alternative disinfection methods; disinfection of drinking/process water, pretreatment before R.O., algae and slime control, purer fermentation products, supply of high purity water for beverage bottling, brewing, pharmaceuticals, cosmetics, food processing and electronics.

For further details, contact:
Hitech Ultraviolet pvt. Ltd., P.O. Box
No. 8356, Grace Plaza, Jogeshwari (W)
Mumbai 400102. email:
hitechuv@bom5.vsnl.net.in
(*Beverage and Food World*, 26(2), 1999,
132)

370 Insectocutor

Pest-O-Kill insectocutor attracts flying insects with its "black-light" lure like the proverbial moth to the candle. The electrified lethal grid does the rest. Harmless to humans. No fear of contamination, as no chemicals are used. The bluetinted light is not injurious to the eye.

Pest-O-Kill can be used where food and beverages are prepared, bottled or canned. Use it where medicines and pharmaceuticals are handled, where hygiene is a vitally essential factor like abbatoirs, breweries, bakeries, canteens, dairies, fisheries, hotels, kitchens, restaurants, swimming pools, TV and film studio, etc.

For more details, contact: 235-A
Adhyaru Industrial Estate Sun Mill
Compound, Lower Parel Mumbai 400
013
(*Beverage & Food World*, 26(2), 1999,
115)

PACKAGING

371 Degradable polythene packaging

Symphony Environmental Ltd. Hertfordshire, England has developed a new degradable plastic, and they claim that a number of factors can initiate the degradation of their Degradable Polythene Packaging, such as ultraviolet light, heat, oxygen and film stress. Once degradation is initiated either before or at the landfill surface, it will continue. The eventual result of the degradation is the release of carbon dioxide and water, exactly the same product that we exhale from our lungs. As the polymer molecules are broken up, the small fragments produced in the presence of air are converted to carbon dioxide and water. These intermediate degradation products, the precursors to carbon dioxide and water, are still polymeric or oligomeric. The degrading material still contains large, water insoluble molecules but not acidic or alkaline water soluble molecular fragments are formed which can contaminate the leachate or water table. Eventually, the resins molecules

will become short enough to be assimilated by micro-organisms and this will happen after the film fragments become water wettable but before they become water soluble.

The final degradation products of polythelene (PE) are the same regardless of whether the initiating system is UV light or heat, provided air is present. These final products are carbon dioxide and water, no matter whether you start with LDPE, HDPE or LLDPE. There is really only one way that PE can oxidise, even though there are a number of ways to initiate the oxidation.

Aerobic micro-organisms oxidise carbon to carbon dioxide in order to obtain energy as well as to build cell materials, the hydrogen in food is oxidised to water. The inorganic materials are not involved in the process. Thus any mineral fillers, metal salts and the like that were present in the plastic to start with will still be there after all the biodegradation of the oxidised plastic has occurred. Metals, for example, tend to end up as metal oxides, which is how they exist in nature in the first place.

(Invention Intelligence, 34(3), 1999, 126)

372 Grip design bottle

A new partnership was undertaken by Wells Soft Drinks and J. Sainsbury in an initiative to redesign the standard squash bottle to benefit the customer. The new bottle uses an easy handling 'grip' design that is cut into the body of the bottle. From one side, the bottle is easier for an adult to grip while the other side facilitates holding and pouring the drink by a child.

According to Wells, market research has shown a consumer perception of the new bottle as innovative, convenient, more comfortable to hold and a better shape than other bottles on the squash market.

(International Bottler and Packer, 73(2), 1999, 54)

373 Packaging with crystal polystyrene

Biopac India Corporation Pvt. Ltd. with its manufacturing facilities in Silvassa, manufacture food containers for the fast food industry. Biopac products are made from crystalpolystyrene-clear, amorphous polymer which provides stiffness, dimensional stability, thermal and electrical properties. Additional attributes include ability not to soak or get soggy, non contamination and recyclability. As food containers they convey hygiene and cleanliness besides being attractive, cost-wise, they are said to compare favourably with similar traditional products.

Among consumer products, Biopac produces dinnerware and cutlery of packaging interest, are take-out food containers-flat type bowls, cups and box type (hinged) containers. Biopac products do not contain CFC, claim the manufacturers. Ease of handling and ability to handle hot and cold products, are also cited as advantages.

For more information contact:
Corporate Office: Glory House 3rd Floor,
Dalta Industrial Plot, Off New Link
Road, Andheri (W), Mumbai – 400053,
e-mail: pushpa@bom3.vsnl.net.in
website: www.biopacindia.com
(Packaging India, 31(6), 1999, 81)

374 Vision's new vertical bagger

Vision Verpackungstechnik GmbH have just launched a vertical form fill seal machine which they tell us offers more 'value for money'. To do this, they have tried to focus on customer Vision Verpackungstechnik GmbH needs rather than mechanical feasibility.

Their mechanically operated V 1250 unit is an intermittent motion bagger that can handle a 250mm wide bag. It incorporates the following features as standard. All parts are manufactured in stainless steel, apart from the film carriage. All machines are equipped with a photocell bag length measuring device, motorized film tracking and a PLC, which can be either Siemen S7 or Allan Bradley. Such a bagger can mechanically run up to 120 bags a minute and yet is only 1440mm tall. This modular bagger is also available as the 380 version, which has been specially designed for use in those areas where high standards of hygiene are necessary for the safety of the product.

For further information contact: H & P Ltd. of Foraden Business Centre, Foraden Road, Market Harborough, Leicestershire, U.K.
(*Food Trade Review*, 69(3), 1999, 203)

375 Ensuring effective protection

The 'Clip' is a new flat opening device for aseptic packaging being launched by International Paper's Beverage Packaging Europe. This innovative system, which is both practical and attractive, is very similar to metal-canned drinks, opening with a laser cut perforation being triggered to

open when the tongue is pulled upwards and featuring a large opening to enable liquid to flow easily. Designed to process 7,200 caps per hour, the machine uses a laser to perforate the cardboard and also attaches the Clip.
(*International Bottler and Packer*, 73(2), 1999, 30)

376 Polypropylene woven mesh bags for vegetables

Automatic Mesh Bag cutting & sewing machine is now available in India from imports for the first time. It will produce bags that will revolutionise the packing and transport of horticultural products like onions, potatoes, corn, peanuts, garlic, etc. in the country. These bags represent the latest technology in the field. Their utilisation will have the following benefits:

1. These are light weight; app. 100 g weighing bag will carry 50 kgs. of products. At present this quantity of product needs a full kilogram weighing gunny bag. The use of these bags, therefore drastically reduces the cost of packing of vegetables.

2. In view of their light weight, these bags will enable larger quantities to be transported per truck/wagon than at present.

3. The existing packs i.e. gunny chokes the vegetables while these bags will provide ventilation and thereby protect the product and improve its shelf life. In cold storage, due to the same facility, these bags will reduce the cost of storage.

4. The existing packs almost hide the product and encourage the nefarious practice of dumping poor quality stuff

at the bottom and only covering the top with better quality material. Since these are mesh bags, transparency will be provided to enable the customer to ensure good quality supplies. This will improve the competitiveness of our products in the domestic and the international markets.

In view of these advantages, the cost of packaging and transport will be considerably reduced and the consumer/processor will be able to secure the vegetables at economic prices and thereby stem the existing trend of increase in prices of vegetables/raw materials. The quality standards will be raised too.

For further details contact Mr. P.P. Kapoor, 178, Aravali Apartments, Alakananda, New Delhi-110019.
(*Indian Food Packer*, 53(2), 1999, 69)

377 Fruit Bites lid

The new easy-to-open, safe foil top used in the relaunch of Golden Circle's canned Fruit Bites to replace the ring pull is a new product packaging innovation developed in Australia jointly by Golden Circle and Amcor Food Cans Australasia. The peelable foil top design is simple to open, has no sharp edges and is ideally packed into a school bag or lunch box where it won't break open or leak. Another major benefit is that the packaging is totally recyclable, an issue that is still extremely important to consumers, said Golden Circle Managing Director, Barry Kelly. Fruit Bites with the new foil lid will also include the addition of two new flavours including Apple Chunks in Light Syrup and Apple Chunks in Banana Syrup.

(*Food Australia*, 51(1/2), 1999, 46)

378 Transparent co-polyester increase shelf life of beverage

AMOCO Chemicals, USA, has come up with a transparent copolyester that, when used as the core layer of polyester packaging promises to give foods and beverages an extended shelf life. A plastic bottle alone cannot keep oxygen from permeating through the package sidewalls. Even glass containers – while they have the barrier performance to keep most oxygen out of the package – cannot protect foods and beverages from oxygen contained in the head space and entering the enclosure. An oxygen scavenger, Amoco's new "Amosorb 3000" copolyester actively traps oxygen from both sources and keeps it away from the bottle's contents. It provides food and beverage processors with a transparent oxygen absorber that is compatible with polyester.

A multilayer polyester bottle with Amosorb 3000 as its core layer traps oxygen before it can permeate the sidewalls. It allows even the most oxygen sensitive products to be packaged in transparent, light weight, shatterproof plastic. The shelf life of a wide range of food products – such as fruit juices, carbonated beverages, tomato-based products, ready to drink teas, and beer – can reportedly be enhanced by Amosorb 3000 – based polyester packaging. The new product is recognised as compliant with U.S. FDA and EEC food contact regulations when used as the core layer of a multilayer structure.

(*Popular Plastics & Packaging*, 44(6), 1999, 80)

379 Longer life for PET bottles

German researchers at Fraunhofer Institute for Process Engineering and

Packaging in Freising are developing a new technology to manufacture hygienic recycled polyethylene terephthalate (PET) bottles which would be used to store soft drinks. Until now, the main problem in the PET recycling technology was that substances that came into contact with the plastic were capable of diffusing into the material. Since it is not possible to be completely sure that consumers are not using empty bottles to store solvents and other chemicals, it is necessary to check the ability of the recycling process to decontaminate the plastic thoroughly. The Fraunhofer researchers have developed a test for this purpose in which a PET bottle is deliberately contaminated with chemicals and then recycled. Afterwards, the scientists analyse the chemical content of the recycled material. In this way, they can see the efficiency of various stages of the process to clean the PET.

The test is similar to a test devised in the United States. But in contrast to the American test, the one employed by the German scientists does not use real harmful substances such as pesticides, but takes a harmless substance as a model which has the same properties as the toxic chemical. The scientists inject the chemicals directly into the PET material without using additional solvents. This process does not produce any environmentally hazardous waste products, which would have to be disposed off by means of costly procedures. The modified test is flexible and can be used to test other types of recycled plastic, enabling those recycling processes to be checked for efficiency, in a cost-effective and environment-friendly manner. Fraunhofer scientists are collaborating

with a German company in this project, the report adds.

(PTI Science Service, 18(6), 1999, 10)

380 Coding Ink

Suvichem Inks have developed a free-flowing flexographic limpud coding ink for marking batch number, manufacturing/expiry date, MRP, etc. Besides good adhesion to many synthetic film surface, the ink has block resistance and resistable to water, ghee, butter and wetpack. The coding ink is suitable to code by Suvichem coder attached with form fill seal machine on pouches of milk, ghee, vanaspati, tea, coffee, spices, etc. It is available in bright shining colours.

For further information contact:

Suvichem Inks, C-34 Ekta Nagar, Bareilly, Uttar Pradesh 243 122.

{Industrial Products Finder, December 1998, 136}

381 Re-sealable tetra pak for dairy products

A style of Tetra Pak carton long used to contain juice and milk for retail distribution is now being used for dairy products in the catering market for the first time. Pritchitt Foods, one of the UK's leading independent dairy food companies, has relaunched five of its key brands, Millac Gold, Roselle Supreme, Millac Whipping Cream, Millac Single Cream and Café Maid, in a new and improved resealable Tetra Pak which the company says is more convenient and more hygienic. The pack has a larger opening, and it pours well, even with more viscous cream products. A pull tab opening is convenient, hygienic and quick. The packs are also resealable. More than four million

litres of cream are produced per year in the Newtownards factory and Pritchitt Foods is anticipating volume growth in the market from the new pack line almost immediately. "This is an initiative that will make us unique in the market – no other manufacturer has been fit to provide the caterer with this packaging," says Paul Freeston, Food Service Director.

Pritchitt Foods has invested 1.2 million in a new one litre packaging machine at its factory in Newtownards. The project has taken nine months to install and the new line will be able to produce 6,000 litres per hour (equivalent to 500 cases).

{Paperboard Packaging, October 1998, 20}

382 Anti-mist packaging

UCB Films has launched a new anti-mist film (right) for packaging prepared salads and other fresh produce. Propafilm TM RK is a biaxially oriented polypropylene (BOPP) film coated differentially with PVdc. The company has developed this film which combines on one side anti-mist properties with a low heat seal threshold for fast running and superb printability on the other. The combination of these features, together with the high barrier, to gases provided by the coatings, makes this film ideal for bags of salad, fruit and vegetable where misting inside the pack detracts from the product's on-shelf appeal. Propafilm TM RK is only one of a series of new coated products planned by UCB Films. Its introduction to the market follows commissioning of the business' second state-of-the-art coater at its Wigton headquarters in the UK. Currently under development is a peelable version, designated T342,

which will give an equality good seal but with easy opening. Says UCB Films Business Manager (Specially Films) BOPP, Fred Garment. "UCB Films expertise in coating technology lies behind the development of this unique film which has been engineered to meet the needs of this specialist market sector."

{Food Technology in New Zealand, 34(6), 1999, 21}

383 Bottle closures

Vaculoc incorporates the very latest in vacuum sealing technology which is far superior to the plastic and screw caps. It is 100 percent leak proof and airtight in both hot filled as well as cold filled products. Whenever bottle is resealed it becomes airtight everytime, which keeps the taste, the freshness & the flavour intact till the last drop is used. Shreeram's Vaculoc is designed as per international specification and it provides you many important benefits.

Shreeram has also introduced a new cap with "Safety Button". This button is pulled down by itself as soon as the vacuum is created inside the bottle/jar, it is a reliable symbol of product purity and package integrity, it not only provides customers the check reference but also prevents illegal opening and destruction so as to protect customer. The button pops-up when opened first time confirming that the product was packed under vacuum and the package was not tampered with during storage. Vaculoc's sealing gasket which is flowed in with special type of PVC compound which plays an important role in sealing the cap. The puffiness of the gasket makes the sealing air tight which results in no leakage, no dust, no dirt. It keeps intact

the taste, the freshness and the flavour of the bottled content.

For further information contact: Shreeram Laminations, C.1-4609, Phase-IV, G.I.D.C. Vatva, Ahmedabad-382445, Gujarat.

{Beverage and Food World, 26(2), 1999, 110}

384 Dixie^R PerficTouchTM paper hot cup

Dixie food service has introduced its answer to the need for a cost-effective, better insulated paper hot cup – the Dixie^R PerfecTouchTM cup. The PerfecTouchTM cup insulates better than two paper cups, one placed inside another, says the company, and its patented paper cup process, which uses the same polyethylene coating as traditional paper cups, keeps the cup warm – not hot – to the touch. The cup is available in 8-, 12-, and 16-oz sizes and it comes in a contemporary stock design featuring a steaming cup of coffee within an art deco décor that is surrounded by a background of floating coffee cups. In addition to this design, the cup can be customized with either a message or a logo.

For further details contact: Dixie Foodservice – Division of Fort James Corp., P.O. Box 6000, Norwalk; Connecticut 06856.

{Tea and Coffee Trade Journal, 171(1), 1999, 94}

385 Ovaltine in tetra briik aseptic slim

Ovaltine, the 95-year old world famous chocolate beverage powder, is now available in ready-to-drink Tetra Briik Aseptic 250 ml slim packages. Introduced in Philippines recently by

snack food giant, Universal Robins Corporation, under license from Novartis Nutrition Phillippines, the product is targeted at school children and teenagers. Positioned as the chocolate/malt food drink for a 'quick body' and 'quick mind', the launch was supported by point-of-sales activities and television advertisements. Containing Ovaltine powder, water, refined sugar, skim milk powder, milk fat and stabilisers, one serving of the 250ml product gives the consumer 10 to 40 percent of the recommended daily allowance of iron, calcium, phosphorous, magnesium and potassium. The same serving size also provides 20 to 30 percent of vitamin A, B1, B2 and folic acid. Product shelf life is 5 months.

{Asia Pacific Food Industry, 11(3), 1999, 81}

ANALYSIS

386 Beer haze instrument

McNab, Incorporated has introduced the Model DLB laboratory beer haze analyzer which provides a 99.9% accurate measurement of large and small haze particles in one instrument. These units are intended to give laboratory personnel precise measurements of yeast and diatomaceous earth as well as protein particles from 0.1 to 1.0 microns.

The Model DLB dual-angle analyzer includes three LED displays to indicate measurements in 90° Nephelometric, EBC, ASBC or custom units; forward scatter (at 11°, 13° or 25°); and bath temperature. The all stainless steel sample chamber is easy to clean in case of accidental spills, and the instrument is supplied with an optical quality sample bottle with cap.

The dual-angle DLB instrument is a quad-head design, with individual heads used for the light source and background interference suppression, as well as the 90° and forward scatter signals. This unique design, combined with common optics, electronics and algorithms, eliminates the distortion error that occurs when comparing with two different sets of instruments. This optical matching facilitates the user's ability to calculate the shelf life of the sample, one of the many uses for the instruments.

Other features of the DLB include temperature control mechanisms, hermetically sealed optics and automatic range selection. The instrument can operate at or below 0° C, with one-touch button control. DLB readings are said to be 99% correlative to McNab's widely used DSB, RS and HSB in-line analyzers. McNab's Model DLB can be used to analyze beer, as well as wine or juice. The company says expected applications include shelf life and colloidal stability predictions, and microbiological poultry and filtration efficiency analyses.

For further information contact: McNab, Incorporated, 20 North MacQuesten Parkway, Mount Vernon, New York 10550, USA. Internet at www.themcnab.com
(*Beverage and Food World*, 26(2), 1999, 102)

387 Universal thermometer for food quality assurance

This food quality assurance thermocouple thermometer will get you world-beating accuracy of $\pm 1^\circ\text{F}$ including both probe and instrument, between 115° and 500° F in 0.1° (or C°

equiv.). By permanently connecting the thermocouple, then accomplishing the final instrument calibration, the manufacturer calibrates out errors in the probe. No other thermocouple thermometer matches this high standard. The probe tip design is the food industry's most popular as a "Universal Fine-tip". It can be used for a 2 second response in food testing due to the extremely small 0.043-inch diameter tip. The short tip length and thicker stem give durability and a full 3.5 inches reach into the food. The universal uses include liquids, soft-solids, and air. Only hard-frozen foods should be avoided.

Designed for the food industry, the housing is sealed with "O" rings, and the probe cable entrance is water right, allowing in wet areas. By simply wrapping the probe cable around the instrument and clicking the probe handle; in place, your probe storage problem is solved. The digital reading display has back lighting for use in dark areas, a reading, "hold" button to safely reach into tight and later note and record data.

(*Dairy, Food and Environmental Sanitation*, 19(7), 1999, 498)

388 High performance infrared analyser

Intra Project Consultants offers the Environmax non dispersive infrared gas analyser. the Environmax is designed for high precision SO₂ and NO₂. The patented optical bench incorporates a unique state-of-the-art optical system which provides for superior selectivity and sensitivity for the gas being measured with minimal response to interfering gases. It has all digital electronics and incorporates electronic chopping which eliminates

the need for any moving parts. Microprocessor control provides accurate linearised digital output.

For more details write to: Intra Project Consultants, 12 C Lord Sinha Road, Shyamkurj 2A1, Calcutta 700 071

{Chemical Products Finder 17(1), 1999, 14}

389 Fish freshness tester

A hi-tech box that can instantly tell the freshness of fish is now in use by a major UK fish processing company. Marr Foods Ltd. of Hull, the largest independent fish processors on the country is now able to determine the quality of the products it receives and dispatches to its multiple customers. A fish spoils much more quickly if it has been frozen and then thawed as the cell structure has been damaged. Additionally, the introduction of many exotic fish to the UK supermarket has added to the problem as they are air freighted into the country with no guarantee of freshness. Distell

Industries of West Lothian has introduced the hand-held-Torry fish freshness meter. This is applied to the fish in question and a freshness reading is provided between 16 and zero, 16 being ultimate freshness. David Fulton, MD explains: "The meter measures the capacitance and phase angle, that is the dielectric properties of the flesh. If the cell structure is intact this offers good dielectric problems. Food which has been thawed has the opposite result." The meter also works on deteriorated fish which has not been frozen.

{Food Manufacture, June 1999, 7}

390 Generation Next from SRC: enhanced vision in color sorting

Generation Next has come to the optical sorter business with an advanced vision system introduced by SRC Vision. The new SRC sorter provides enhanced color recognition, custom algorithms for specific products (colour, size and shape) and the capacity to recognize ten times as many pixels per second as previous models. The system incorporates a number of features that customers and operators had asked for. These included an advantage graphic user interface, enclosing previously exposed cabling, pipeline architecture for real-time processing, custom DSPs for greater processing power, modular software for product-specific algorithms, and a Windows NT platform that supports a remote interface.

For more information contact: SRC Vision, 2076 Commerce Dr. Medford, Oregon 97054, USA
{Quick Frozen Foods International, 40(3), 1999, 12}

391 Modular liquid chromatographs

The ProStar series, may be configured as dedicated analytical HPLC systems, biocompatible HPLC instruments, or high-throughput preparative units. Features include pumping system with flow rates ranging from 0.001 to 3,200 ml/min; a wide range of pump configurations, from isocratic (one solvents); several detector options such as diode array, multiple UV/visible, RI detectors, fluorescence, and electrochemical; and various autosamplers.

For more information, contact: Varian Analytical Instruments, Department No. 87, P.O.Box 954, Santa Clarita, CA 91355-9054.
{Food Technology, 53(1), 1999, 86}

COMMERCIAL INTELLIGENCE**PRODUCTION (RAW MATERIALS)****392 Area and production of arecanut**

Year	Area (hectares)	Production (tonnes)
1956-57	94,799	74,759
1961-62	1,15,879	97,119
1971-72	1,74,305	1,50,505
1981-82	1,82,607	1,94,707
1991-92	2,21,805	2,51,005
1992-93	2,22,031	2,48,401
1993-94	2,37,800	2,75,000
1994-95	2,35,500	2,72,400
1995-96	2,54,100	2,99,800
1996-97	2,64,000	3,13,300

{Hindu Survey of Indian Agriculture, 1999, 98}

393 Black pepper production

Year	Production (tonnes)
1961-62	28,000
1989-90	45,000
1990-91	65,000
1991-92	55,000
1992-93	60,000
1993-94	60,000
1994-95	50,000
1995-96	55,000
1996-97	60,000
1997-98	58,000
1998-99	75,000

{New Indian Express, 2 March 1999, 16}

394 Onion production

Year	Area ('000 ha)	Production ('000 tonnes)
1991-92	331.76	4705.83
1992-93	380.17	5704.74
1993-94	367.50	4006.40
1994-95	378.60	4036.10
1995-96	395.50	4080.00

{Business Line, 9 March 1999, 13}

395 India largest producer of banana

India has emerged as the largest producer of bananas with total production of 13.2 million tonnes per annum from four lakh hectares and stood number one, exceeding mango production and accounting for 32% of the country's fruit production, according to Dr.P.Sundaraju, Director (incharge), National Research Centre on Banana (NRCB) at Tiruchirapalli.

{Pestology, 23(5), 1999, 87}

PRODUCTION (INDUSTRIAL)

396 Coffee production: All India

Year	Production (MT)	
	Arabica	Robusta
1993-94	88500	119500
1994-95	79000	101000
1995-96	103250	119750
1996-97*	90450	114550

* Provisional

State	Arabica	%	Robusta	%	Total	% to India
Karnataka	79325	50	80105	50	159430	69.3
Kerala	1570	3	49055	97	50625	22.0
Tamil Nadu	13500	78	3805	22	17305	7.5
Non-Traditional areas	1900	93	150	7	2050	0.9
Non-Conventional areas	570	97	20	3	590	0.3
All India	96865	42	133135	58	230000	100.0

{The Planters' Chronicle, 95(3), 1999, 111}

397 World oil production

Commodity	Production (1998-99)
Soybean oil	24.31
Sunflower oil	9.37
Rapeseed oil	13.14
Palm oil	17.02
Others	17.70
Total	81.54

{The Economic Times, 12 April 1999, 6}

EXPORT

398 Principal food exports

Quantity: Thousand tonnes
Value: Rs. Crore & US \$ millions

		1994-95			1995-96			1996-97		
		Qty.	Rs. Cr.	\$ million	Qty.	Rs. Cr.	\$ million	Qty.	Rs. Cr.	\$ million
I.	Agricultural and allied products:	--	13712	4367	--	21138	6320	--	25040	7054
	of which									
I.1	Coffee	128.5	1053	335	156.1	1503	449	163.0	1426	402
I.2	Tea and mate	151.4	975	311	158.7	1171	350	139.5	1037	292
I.3	Oil cakes	150.8	1798	573	4330.9	2349	702	4787.7	3495	985
I.4	Tobacco	53.7	255	81	87.1	447	134	117.0	757	213
I.5	Cashew kernels	80.2	1247	397	70.8	1237	370	70.4	1288	363
I.6	Spices	155.0	612	195	204.1	794	237	222.1	1201	339
I.7	Sugar and molasses	51.1	62	20	734.4	506	151	1716.3	1078	304
I.8	Raw cotton	70.7	140	45	33.3	204	61	269.5	1575	444
I.9	Rice	890.6	1206	384	4914.0	4568	1366	2512.0	3172	894
I.10	Fish and fish preparations	320.9	3537	1126	310.1	3381	1011	394.5	4008	1129
I.11	Meat and meat preparations	--	403	128	--	627	187	--	709	200
I.12	Fruits, vegetables and pulses (excl. cashew kernels, processed fruits and juices)	--	606	193	--	802	240	--	828	233
I.13	Miscellaneous processed foods (incl. processed fruits and juices)	--	282	90	--	745	223	--	974	274

(The Hindu Survey of Indian Industry,
1998, 472)

399 Global pepper exports scenario

	Qty in tonnes
India	40,000
Indonesia	30,000
Malaysia	22,000
Vietnam	20,500
Brazil	12,000
Sri Lanka	6,300
Thailand	1,500
Others	3,300
Total	1,35,600

{Financial Express, 8 March 1999, 16}

400 Shrimp exports

Year	Quantity in tonnes; Value in Rs. Crores	
	Quantity	Value
1989-90	57,819	463.41
1990-91	62,395	663.32
1991-92	76,107	976.16
1992-93	74,393	1180.26
1993-94	86,541	1770.73
1994-95	101,751	2510.27
1995-96	90,000	2429.00
1996-97	105,429	2701.79
1997-98	100,977	3121.35

{Business Line, 7 May 1999, 13}

401 Export of oil

Oil	1994 -95	1995 -96	1996 -97	1997 -98	1998 -99
Palm	10.6	10.6	11.9	11.7	11.5
Soya	5.6	5.0	6.7	7.8	7.6
Sun-flower	2.9	2.5	3.2	3.0	3.3
Rape-seed	2.0	1.9	1.8	2.1	2.2
Tallow	2.6	2.3	2.0	2.2	2.3

{Lipid Technology, May 1999, 72}

TRADE INFORMATION

402 Information network to link panchayats

The Government of India has decided to go for the IT push in a big way building on the strength of the educated human resource potential in the state. The finance minister has declared an ambitious plan to start internet kiosks in all panchayats and link panchayats through an information network. All government departments have been allowed to set apart 3% of their budgetary allocation for computerisation. Software business in the state has been completely exempted from sales tax. Newly launched hardware units would also be given a sales tax holiday of seven years, subject to ceiling of 150% of the fixed capital investment.

{Deccan Herald, 22 March 1999, 21}

403 Polish Chamber of Food Ingredients in Europe

The Polish Chamber of Food Ingredients has been formed in Poland and is believed to be the first organization of this type in Europe. The new group gathers information on manufacturers, dealers, and users ingredients, an objective which was necessitated by the developing market, production and use of food additives in Poland. The Chamber provides information about scientific and technical advances for its more than 100 members and gives assistance in establishing contacts and promoting products. Examples are: scientific conferences on colorants, flavors and gelatine organized in 1998 and cooperation with Miller Freeman B.V and with the Polish Food

Technologists' Society, which helps to organise future conferences such as "Food Ingredients Central & Eastern Europe." In addition, the Chamber publishes books, such as *Aromas and Colorants for Food*, and quarterly informational bulletins focusing on current problems concerning food ingredients. It also assists foreign companies in establishing cooperation with Polish companies.

For further details contact:
Polish Chamber of Food Ingredients,
Al. 1 Maja 13, 62-510 Konin, Poland.
Email: polcfi@kn.onet.pl.
(*Food Technology*, 53(3), 1999, 93)

404 FoodSafety - a new web site established

www.foodsafety.gov is a "gateway" web site designed to help the public find government food safety information more readily on the Web. The site provides links to food safety-related websites from federal, state and local government agencies. www.foodsafety.gov is one of the initiatives of the May 1997 National Food Safety Initiative Report to the President. This site was developed by FDA's Center for Food Safety and Applied Nutrition (CFSAN) in consultation with USDA's Food Safety Inspection Service (ISIS).
(*Dairy, Food and Environmental Sanitation*, 19(3), 1999, 200)

405 Food news on internet

A very useful site for accessing information on food processing has been developed by the Food Links project of IDRC in Canada. They have searched the Internet and produced an annotated list of useful sites on post harvest activities including food

processing. This can be found at www.idrc.ca/foodlinks/browse.html. The Food and Agriculture Organisation of the UN is proposing to develop an Information Network on Post Harvest Operations. This would make validated information on all aspects of post harvest operations available on the Internet. Food and Nutrition Internet Index (FNII) is a fully searchable website describing and indexing food and nutrition resources available on the internet which can be found at www.fnii.ifis.org.
(*Intermediate Technology Food Chain*, 23 July 1998, 17)

406 Agriculture department on the web

The Agriculture Minister, Mr. Som Pal, has launched the website of the Department of Agriculture and Cooperation (DAC) on the Internet. The website, designed by the National Informatics Centre (NIC) will disseminate information regarding its activities and programmes to the public. The website will also contain information about the programmes and schemes of the Ministry of Agriculture, prices of farm produce, agricultural statistics, daily weather conditions and various documents and reports of the Ministry. Names and telephone numbers of the officials in the Ministry are also available on the site.

The site can be accessed at <http://web.Delhi.Nic.In/Mmapd/Agri-new>. The related websites of ICAR, NIC, India Meteorological Department can also be accessed through the DAC website.
(*Business Line*, 15 April 1999, 14)

STN International, the world's leading online service for scientific and technical information, has enhanced its Food and Agriculture cluster to include the FROSTI database, compiled by Leatherhead Food Research Association. The database covers all aspects of the food and drinks industry, including ingredients and process technology, quality control, microbiology, manufacturing, packaging, food chemistry, biotechnology, food safety and nutrition, recipes and additives. Sources include more than 800 scientific and technical journals published worldwide, as well as technical reports, books, bulletins, conference papers, literature and patents. FROSTI currently contains more than 400,000 records, 95% with abstracts. Covering the period from 1972 to the present, the database is updated twice weekly and has a growth rate of more than 25,000 records per year.

For further information contact: Mat Pfleger, Leatherhead Food RA, Email: mpfleger@lfra.co.uk.
(*Food Australia*, 51(3), 1999, 61)

408 Soy isoflavone database

The USDA has launched an Internet database to help scientists identify which isoflavones in soy foods may be responsible for a lower risk of cancer, especially breast cancer. Some of these estrogen-like compounds have been reported to benefit the cardiovascular system or to reduce bone loss after menopause, said Agriculture Secretary Dan Glickman, "so the new database could help nutritionists and physicians. They'll be better equipped to recommend foods with the highest levels of specific

compounds." Scientists with USDA's Agriculture Research Service compiled the database. It gives values for the major isoflavones in 128 soy foods and ingredients, said lead scientists Gary Beecher and Joanne Holden at ARS's Beltsville Human Nutrition Research Centre in Beltsville and Riverdale. Isoflavones such as daidzein, genistein and glycitein mimic the hormone estrogen. "They also have antioxidant capability, and may perform other functions that enhance health."

(*Food Australia*, 51(6), 1999, 237)

NEW INDUSTRIES AND TRAINING CENTRES

409 Canadian Agri Co. to set up potato plant

Nalley's, a Canadian agro processing major, is setting up a potato product (flakes, chips) plant in Jalandhar. The plant is being set up in collaboration with the Sanghi brothers of Punjab. The plant's construction will be kicked off by Punjab CM, Prakash Singh Badal on January 10. Nalley's has also signed an MoU with a company in Gujarat and plans to set up a plant there. Nalley's joins a growing list of Canadian agri-majors which are eyeing the Indian market. While a few have already set shop in the country, either on their own or in collaboration with an Indian partner, others are scouting for local partners to step into the local market. According to Mr. Ram Gupta, adviser (trade) at the Canadian High Commission, "Canadian companies have been interested in coming to

India for a long time, and now after liberalisation these firms are now keen on doing business in the country." Mr. Gupta added, "Even now the markets have not been completely thrown open, there is a need to relax the bevy of procedures and also to scale down import duties."

Among the companies already doing business in India is the Indo-Canadian Fine Foods Ltd, a licensee of R&R Associates - a Canadian NRI venture, which is selling refined Canola oil under the brand name of Canola-lite. Canola oil is an oilseed crop primarily grown in Western Canada and is 94% saturated fat-free. The company imports Canola oil from Canada in bulk, 20-tonne bladders. The product is re-packaged in 1,2,5,10,15 ltrs format at the company's repacking plant in Ahmedgarh (Punjab) and sold in Punjab and Haryana. The company plans to import \$20 million worth of Canola oil and retail Canola-lite all over the country. Canada's agri-products industry produces a wide range of products, with annual sales of over \$60 billion. Agri-food is one of Canada's top 5 industries and accounts for 10% of Canada's GDP. Frozen potato products account for two-thirds of all vegetable exports from Canada.

(Indian Food Packer, 53(2), 1999, 75)

410 India, Australia start groundnut project

India has entered into a collaborative agreement with Australia on a project aimed at developing new breeding approaches and identification of drought resistant groundnuts. The project also seeks to enhance the level of scientific

collaboration among the partners- Queensland Department of Primary Industries, the All-India Coordinated Research Project on Groundnut and the International Crop Research Institute for the Semi-arid Tropics (ICRISAT). The Australian Centre built the project on an earlier project for International Agricultural Research (ACIAR) in the area. Training and capacity building, including frequent visits to Australia by team members form important components of the project.

(Agriculture Today, 2(2), 1999, 63)

411 Stainless steel paddy parboiler plants from SKF

The Moodbidri based SKF Industrial Corporation has introduced stainless steel paddy parboiler and drier plants. According to the Chairman and Managing Director of SKF, Mr. Ramakrishna Achar, though the use of stainless steel would increase the cost of the plant by approximately 50%, "in actual terms, when one considers the total project cost of a rice mill, the increase works out to just about 10%". The use of stainless steel, according to Mr. Achar, also increases the lifespan of the plant from the present five years to 20 years and maintenance costs would be zero for the first 10 years of operation. The stainless steel plant also "ensures more hygienic end-products considering that there is no corrosion and rusting as in conventional plants made of M.S steel". Mr. Achar said the new heat exchangers with copper fins incorporated in the plant would ensure a high level of thermal efficiency and help in increasing the production by substantially reducing fuel and power consumption as well as the labour required to man the plant.

"Ultra modern belt conveyors also ensure round-the-clock smooth functioning, easy operation and minimum wastage of grains". This is part of the Moodbidri-based SKF (Sri Kalikamba Fabricators) Industrial corporation's plans to expand its operations and capacity. Located at Bannaka near Moodbidri, SKF manufactures and installs parboiling and drying plants for rice mills and has conducted preliminary surveys to gauge the potential for exporting the plants to Indonesia, Sri Lanka, Bangladesh and South Africa. SKF is also making inroads into Punjab and Haryana. Started in 1987 with an initial capital of Rs. 25,000, SKF is a success story of sorts for 'rural entrepreneurship' in this entire region, now having notched up a turnover of Rs. 8 crores with a monthly capacity of installing five plants per month, each costing approximately Rs. 21 lakhs. The company has installed 300 of its plants in Karnataka and Andhra Pradesh. Its annual turnover is also expected to double to around Rs. 15 crores.

{Business Line, 12 June 1999, 13}

412 Welcomlab ensures quality food, hygiene and environment

An in-house laboratory or Welcomlab (as it is known in ITC Welcomgroup hotels) is pioneered by the ITC hotels. The first Welcomlab was operated in the Grand Kakatiya Hotel, Hyderabad. The Welcomlab's function is to carry out continuous chemical and microbiological monitoring of water, food, handling systems and environment in various stages of operations starting from receiving to final guest delivery of

product or service. There are also inhouse qualified microbiologists and chemists who go around collecting samples and give their reports to the respective departments at the end of the day. Hazard critical centre point studies are also conducted for preparations containing potentially hazardous food. Certain critical parameters in waste water (for example, BOD) and legionelle in cooling water etc., are also monitored. Daily monitoring of food, environment and handling systems give a realistic safety status of the operations and enable timely corrective actions. Such activity also serves to increase awareness amongst food handlers, resulting in improved operational hygiene.

Welcomlab is also actively engaged in various aspects of research pertaining to food, water and environment safety. A unique safe and washing system called the 'Hygiene Kiosk' based on ultrasonics, has been developed wherein water molecules vibrating at 40,000 cycles/second penetrate into finger nails and remove microscopic dirt, thus avoiding soap or detergent, a source of pollution. Special sanitisers based on Quat MBA ammonium compound and liquid chlorine have been developed for special application to break the chain of infection. Pest infestation is another major concern for food safety. To avoid toxic pesticidal sprays, herbal pest control, based on repellents, have been developed and are now in place. This treatment involves no sprays and is extremely effective on cockroaches. Work is in progress to develop similar system for flies etc. Another exciting project in progress is studies on biogas technology for energy generation from

a food waste-involving biomethanation process. Laboratory trials conducted so far the production of biogas and an end product having manure values and can be used in gardens. A food, water and environment safety audit is done every six months for all the Welcom-group hotels by corporate head quarter specialists. The audit basically checks policy and procedures on operations, receiving, storage, food preparation, handling, service, personnel hygiene, waste managements, energy management, environmental management etc in accordance with a checklist.

{Financial Express, 23 May 1999, 9}

413 National Seafood Centre

National Seafood Centre (NSC) is an initiative funded by Fisheries Research and Development Corporation (FDRC) and Department of Primary Industries Queensland, NSC assists business from all around Australia to achieve their seafood product development R & D objectives. It benefits from a strong advisory committee drawn from industry and government and networks with other national FRDC-funded initiatives, such as AUSEAS responsible for seafood information, SeaQual concerned with seafood safety and quality assurance and Hooking into Asia, focusing on Asian Market opportunities. NSC's primary purpose is to help seafood operators add value to the Australian catch by supporting commercial opportunities in post harvest handling, processing and product development. NSC has funding to share the cost of doing so in short-term contracted projects. Adding value can mean developing a new processed product which suits

changing markets and consumer patterns. It can also mean delivering species alive, to market here or overseas, improving product handling or packaging to achieve desirable quality attributes which result in a better price, product differentiation or finding or creating new market niches. In all cases it is achieved through effort and strengthened by relationships. NSC has been a partner in achieving the commercial launch of a number of new products including canned sardines and anchovies from Western Australia, shark cartilage powder from Queensland, UHT seafood soups from Tasmania including smoky fish chowder and prawn bisque.

For further information contact: Ian Wells, National Seafood Centre, Email: wellsi@dpi.qld.gov.au; web: www.dpi.qld.gov.au/cft/nsc.html.
{Food Australia, 51(3), 1999, 102}

414 FoodTech consulting

Dr. Patrick Harewood, consultant food scientist, announces the opening of FoodTech consulting. The organisation will provide consulting services to the food industry in the areas of safety, quality, sanitation and HACCP, including design, development, implementation, verification and auditing of HACCP plans. Each HACCP plan is designed and developed according to the specific requirements of each product and processing operation. Services are provided to the meat, poultry, seafood, food service, retail, wholesale, refrigerated and frozen foods industries, both domestic and international. On site training in food

safety/ HACCP, SSOPs and GMPs is also provided.

For further information contact: P.O Box 808, North Branford, CT, USA. Email: Pharewood@compuserve.com. web: www.foodteconsulting.com.

{*Dairy, Food and Sanitation*, 19(4), 1999, 276}

415 ACF's Food Science Bureau

The Australian Food Council is to establish a Food Science Bureau to provide consumers, industry and key policy makers access to scientifically substantiated information about food and related technologies. "Consumer surveys, feedback through our member company's hotlines and our own assessment, indicates that there is a lack of awareness and there is often confusion, misunderstanding and frustration among consumers about food science and emerging technologies. New food biotechnologies are case in point. Consumers want to be confident that the safety and integrity of food and drink products is maintained with the application of this new technology, notwithstanding the potential benefits in improved variety, new functions and enhanced nutrition. Consumers are looking for soundly based factual information devoid of any particular agenda, to make their own informed judgements. The Food Science Bureau's objective is to fill that void," said Mitch Hooke, Australian Food Council Executive Director. The Bureau will complement the AFC's existing public information campaigns in food safety, nutrition and health and food biotechnology. The AFC is recognised as a reputable source of

information on these and other of food science related topics.

{*Food Australia*, 51(3), 1999, 62}

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

416 HACCP certification for eight units

The Bureau of Indian Standards (BIS) has granted the Hazard Analysis and Critical Control Point (HACCP) certification to eight food units in the dairy, rice processing and spices sector. The units that have been granted HACCP certification are Mittulaul Lalah & Sons (Chennai), Kishore Spices Co (Kochi), Mother Dairy (Delhi), Punjab Milkfed (Chandigarh), Ludhiana District Cooperative Milk Producers' Union Ltd (Ludhiana, Punjab), Ropar District Cooperative Milk Producers' Union Ltd., (Mohali, Punjab), Pepsi Food Ltd (Sonapat, Haryana) and Vadilal Industries Ltd (Bareilly, UP).

HACCP is the technical equivalent of the International Codex Alimentarius Commission Standard, which confers the highest food hygiene and safety recognition throughout the food chain right from the primary producer to the final consumer, a BIS release stated. It offers HACCP certification against IS 15000 food safety standard alone, as well in conjunction with ISO 9000 through a single audit.

{*Business Line*, 15 April 1999, 14}

**417 Vegetable Oil Products
(Regulation) Order, 1998**

G.S.R. 741(E).— In exercise of powers conferred by section 3 of the Essential Commodities Act, 1955 (10 of 1955), and in supersession of the Vegetable Oil Products (Control) Order, 1947 and the Vegetable Oil Products (Standards of Quality) Order, 1975, except in respect of things done or omitted to be done before such supersession the Central Government hereby makes the following Order, namely:-

1. Short title, extent and commencement.- (1) This Order may be called the Vegetable Oil Products (Regulation) Order, 1998.
- (2) It extends to the whole of India.
- (3) It shall come into force on the date of its publication in the Official Gazette.
2. Definitions.- In this Order, unless the context otherwise requires.-
 - (a) "Act" means the Essential Commodities Act, 1955 (10 of 1955);
 - (b) "bakery shortening" means Vanaspati meant for use as a shortening or leavening agent in the manufacture of bakery products, that is, for promoting the development of the desired cellular structure in the bakery product with an accompanying increase in its tenderness and volume;
 - (c) "blended edible vegetable oil" means an ad-mixture of two or more edible vegetable oils;
 - (d) "Commissioner" means the officer appointed as the Vegetable Oil Products Commissioner by the Central Government and includes any other officer authorised by him to exercise any or all of the powers of the Vegetable Oil Products Commissioner under this Order;
 - (e) "hydrogenation" means the process of addition of hydrogen to an edible vegetable oil using a catalyst to produce a fat with semi-solid consistency;
 - (f) "interesterification" means the process by which one or more edible oils are treated, through the use of a catalyst, so as to bring about a re-arrangement of the fatty acid positions within the

glyceride moieties, thereby changing the physical properties like melting point, viscosity, specific gravity;

(g) "label" means a display of printed, perforated, stencilled, embossed or stamped matter on the container of any vegetable oil product;

(h) "margarine" means an emulsion of edible oils and fats with water;

(i) "producer" means a person engaged in the business of manufacturing any vegetable oil product;

(j) "refining" means a process by which any vegetable oil is deacidified, bleached and deodorised;

(k) "registration certificate" means the registration granted to a Producer under clause 3 of this Order;

(l) "sample" means a sample taken under sub-clause (2) of clause 8 of this Order;

(m) "Schedule" means a Schedule appended to this Order;

(n) "vanaspati" means hydrogenated vegetable edible oil meant for human consumption;

(o) "vegetable oil product" means any product obtained for edible purposes by subjecting one or more edible oils to any or a combination of any of the processes or operations namely, refining (excluding solvent extracted oil), blending, hydrogenation or interesterification and winterisation (process by which edible fats and oils are fractionated through cooling), and includes any other process which may be notified by the Central Government in the Official Gazette.

3. Registration.- (1) On and from the date of commencement of this Order, no producer shall carry on business of a producer unless such producer has made an application to the Commissioner as specified in the Schedule-I, and has obtained a registration certificate as specified in the Schedule-II:

Provided that all registrations made under the Vegetable Oil Products (Control) Order 1947, shall be deemed to be registered under this Order:

Provided further these registrations shall comply with the provisions of this Order.

(2) No producer shall be eligible for registration under this Order unless he has his own laboratory facilities for analytically testing of samples.

(3) After making necessary enquiries, the Commissioner shall, as he deems fit, issue the registration certificate as specified in Schedule-II to the applicant, or reject the application, for reasons to be recorded in writing.

4. Cancellation of registration.- The Commissioner, may, after giving the producer an opportunity of being heard, cancel any registration granted to him under this Order for any contravention of the provisions of this Order.

5. Appeal - Any person who is aggrieved by the order of cancellation under clause 4 may make an appeal to the Central Government against such order within a period of thirty days of the receipt of such order and the decision of the Central Government shall be final.

6. Power to regulate production of vegetable oil products.- (1) No producer shall manufacture, stock for sale, sell or offer for sale, any vegetable oil product unless it conforms to the standards of quality and other requirements for vegetable oil products as specified in Schedule-III for Vanaspati, in Schedule-IV for Bakery shortening, in Schedule-V for Margarine, and in Schedule-VI for Blended edible vegetable oil respectively:

Provided that the Commissioner with the previous approval of the Central Government may, by order, in public interest, for reasons to be recorded in writing, in specific circumstances and for a specified period, relax any or all of the requirements specified in this order for such manufacture, stocking or sale of any variety of vegetable oil products.

(2) The Commissioner may, having regard to the availability of vegetable oils and all other relevant factors, prescribe the maximum or minimum limit of usage of any vegetable oil specified in the Schedule-III in the manufacture of vanaspati.

7. Power to prescribe monthly returns.- Every producer shall furnish by the seventh day of the following month to the Commissioner a return in respect of each vegetable oil product manufactured, sold or imported or exported during that month in a form as may be specified by the Commissioner from time to time.

8. Power to carry out inspection, entry and sampling.- (1) The Commissioner may enter and inspect any premises, vehicles or vessels and seize the stocks of vegetable oil products, in respect of which he has reason to believe that a contravention of any of the provisions of this Order has been or is being or is about to be committed.

(2) The Commissioner may take samples of vegetable oil products for examination as per procedure which may be specified by the Central Government from time to time, in this behalf.

(3) The Commissioner may inspect, or cause to be inspected any record relating to the production, supply, distribution, import and export of vegetable oil products including the

purchase of raw materials used in their production and every producer shall be bound to furnish all such information to the Commissioner.

9. Delegation of powers.- The Central Government may, by notification in the official Gazette, direct that any or all of the powers conferred, on the Commissioner by this Order shall, subject to such conditions, if any, as may be specified in the direction, be exercisable also by-

- (1) any officer or authority of the Central Government; and
- (2) a State Government or any officer or authority of a State Government.

Schedule-I

[See clause 3(1)]

Application for registration under the Vegetable Oil Products (Regulation) Order, 1998.

To

The Vegetable Oil Products Commissioner,
Directorate of Vanaspati, Vegetable Oils and Fats,

Sir,

I/We

(Name and address of the applicant) request that I/we may be registered under the Vegetable Oil Products (Regulation) Order, 1998.

1. Name and address
(location) of the unit
2. Proposed item of manufacture
and annual installed capacity

S.No.	Vegetable Oil Product	Date of installation of manufacturing unit	Annual installed capacity in metric tonnes

3. Details of plant and machinery:

4 (i) Whether the Unit is equipped with an analytical laboratory to carry out the tests specified in the Schedules to this Order

Yes / No

(ii) If yes, the details thereof

I / We hereby certify that the above statement is true and correct to the best of my/our knowledge and belief. I / We hereby undertake to comply with all the provisions of the Vegetable Oil Products (Regulation) Order, 1998

Place:

Date:

Signature of the applicant

(Full particulars of the applicant i.e. name and designation etc. in block letters)

Schedule-II

[See clause 3(1)(3)]

Ministry of Food and Consumer Affairs
(Department of Sugar and Edible Oils)
Directorate of Vanaspati, Vegetable Oils and Fats

Registration Certificate

This is to certify that M/s..... is hereby registered under Vegetable Oil Products (Regulation) Order, 1998 with this Directorate and is allotted the below mentioned Registration Number:-

No.

Date

for the factory located at for manufacture of the following products:-

Items

Annual installed capacity
(in Metric Tonnes)

- (i)
- (ii)
- (iii)
- (iv)
- (v)
- (vi)

Dated :

(-----)
Vegetable Oil Products Commissioner

Schedule-III

[See clause 6(1) and (2)]

Vanaspati

- (1) Vanaspati shall be prepared from one or more of the following vegetable oils:
 - (i) Coconut Oil
 - (ii) Cottonseed Oil
 - (iii) Dhupa Fat
 - (iv) Groundnut Oil
 - (v) Kokum Fat
 - (vi) Linseed Oil
 - (vii) Mahua Oil
 - (viii) Maize (Corn) Oil
 - (ix) Mango Kernel Fat
 - (x) Mustard / Rapeseed Oil
 - (xi) Nigerseed Oil
 - (xii) Palm Oil
 - (xiii) Phulwara Fat
 - (xiv) Ricebran Oil
 - (xv) Safflower (Kardiseed) Oil
 - (xvi) Salseed Oil(upto 10%)
 - (xvii) Sesame Oil
 - (xviii) Soyabean Oil
 - (xix) Sunflower Oil
 - (xx) Watermelon seed oil
 - (xxi) Vegetable oils imported for edible purposes
- (2) The product shall contain raw or refined Sesame(Til) Oil in sufficient quantity to ensure that the product conforms to the requirement for Baudouin Test as given in A.19(x) of Appendix B to the Prevention of Food Adulteration Act & Rules, 1955.
- (3) The refined vegetable oils specified in (2) above shall conform to the standards of quality prescribed under Item A.17.15 of Appendix B to the Prevention of Food Adulteration Act & Rules, 1955 or Schedule-IV to the Solvent Extracted Products (Regulation) Order, 1998.

(4) The product shall conform to the following requirements:-

- | | | |
|--------|--|--|
| (i) | Moisture, per cent by mass | Not more than 0.25 |
| (ii) | Melting point | 31°C to 41°C |
| (iii) | Butyrefractometer reading at 60°C | Not less than 40.0 |
| (iv) | Unsaponifiable matter, per cent by mass:- | |
| | (a) where the use of rice bran oil in vanaspati is less than 30 per cent by mass | Not more than 2.0 |
| | (b) where the use of rice bran oil in vanaspati is more than 30 per cent by mass | Not more than 3.4 |
| (v) | Free fatty acid (as oleic acid), per cent by mass | Not more than 0.25 |
| (vi) | Baudouin Test (in 1 cm cell on Lovibond scale) | Not lighter than 2.0 Red Units |
| (vii) | Synthetic Vitamin 'A' | Not less than 25.0 International Units per gram at the time of packing and shall test positive when tested with Antimony Trichloride (Carr-Price Reagent). |
| (viii) | Residual Nickel | Not more than 1.5 ppm. |

Note: Methods of testing shall be as prescribed under IS: 548 (Part II).

Schedule-IV

[See clause 6(1)]

Bakery Shortening

In addition to the requirements for Vanaspati prescribed in the Schedule-III, bakery shortening, if aerated, shall conform to the following requirements :

- (1) Only nitrogen or any other inert gas shall be used in the manufacture of the product;
- (2) The quantity of such gas in the product shall not exceed 12 per cent by volume thereof.

Schedule-V

[See clause 6(1)]

Margarine

(1) In modification/addition to the requirements for Vanaspati, Margarine shall conform to the following requirements:-

- | | |
|--|--|
| (i) Fat content (Vanaspati or a mixture of vanaspati and refined vegetable oils), per cent by mass | Not less than 80 |
| (ii) Moisture, per cent by mass | Not less than 12 and not more than 16 |
| (iii) Synthetic Vitamin 'A' at the time of packing | Not less than 30.0 International Unit per gram |
- (2) In addition to the requirements for Vanaspati, the separated fat of Margarine shall conform to the following modified requirements of quality :-
- | | |
|---|--------------------------------|
| (i) Melting Point | 31°C to 37°C |
| (ii) Baudouin test (in 1 cm cell on Lovibond scale) | Not lighter than 2.5 Red Units |

Note Methods of test shall be as prescribed under IS 548(Part II)

Schedule-VI

[See clause 6(1)]

Blended edible vegetable oil

Blended edible vegetable oil shall conform to the following requirements:-

- (1) Moisture and Volatile matter, per cent by mass Not more than 0.2
- (2) Acid value:- As prescribed under Item A.17.24 of Appendix B to the PFA Rules, 1955
- (3) Unsaponifiable matter, per cent by mass:-
 - (i) Blend with rice bran oil Not more than 3.0
 - (ii) Blend with other edible vegetable oils Not more than 1.5
- (4) Flash point. Not less than 250° C

[F. No 2-VP(1)/97]

SUSHAMA NATH, Jr. Secy.

418 Prevention of Food Adulteration (2nd Amendment) Rules, 1999

G.S.R. 241 (E).—Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health), number G.S.R. 672(E), dated the 27th November, 1997 in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i), dated the 27th November, 1997 inviting objections and suggestions from the persons likely to be affected thereby; before the expiry of four months from the date on which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said Gazette of India were made available to the public on 4th December, 1997;

And whereas the objections and suggestions received from the public on the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954), the Central Government, after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely :—

1. (1) These rules may be called the Prevention of Food Adulteration (2nd Amendment) Rules, 1999.

(2) They shall come into force from the date of their publication in the Official Gazette except rules 2(i), 2(iii) (b), 2(iii) (c) which shall come into force from 1999.

2. In the Prevention of Food Adulteration Rules, 1955,—

(i) after rule 37C, the following rules shall be inserted, namely :—

'37D. Labelling of edible oils and fats—The package, label or the advertisement of edible oils and fats shall not use the expressions "Super-Refined", "Extra-Refined", "Micro-Refined", "Double-Refined", "Ultra-Refined", "Anti-Cholesterol", "Cholesterol Fighter", "Soothing to Heart", "Cholesterol Friendly", "Saturated Fat Free" or such other expressions which are an exaggeration of the quality of the Product';

(ii) in rule 57, in sub-rule (2), in the Table,—

(a) against serial No. 1 relating to Lead, in column (2),

(A) for item (1-b) and the entry relating thereto in column (3), the following shall be substituted, namely :—

(2)	(3)
"(i-b) Edible oils and fats	0.5";

(B) in item (ii), the words "edible oils and fats" shall be omitted;

"(10) Nickel All hydrogenated, partially 1.5";
hydrogenated, interesterified vegetable oils and fats such as vanaspati, table margarine, bakery and industrial margarine, bakery shortening, fat spread and partially hydrogenated soyabean oil.

(iii) in Appendix 'B',—

(a) in item A-12, in the paragraph preceding the first proviso, for the words figures and letters "It may also contain diacetyl as a flavouring agent upto a maximum limit of 4.0 ppm", the following shall be substituted, namely :—

"It may also contain Lactic Acid, Butyric Acid, Valeric Acid, Cinnamon Oil, Ethyl Butyrate as flavouring agents upto 0.08 ppm m/m and Diacetyl as a flavouring agent upto a maximum limit of 4.0 ppm";

(b) in item A.17.25,—

(i) standard No. 2, and the entries relating thereto shall be omitted;

(ii) for standard No. 3, and the entries relating thereto, the following shall be substituted, namely :—

"3. Refractive Index at 40°C

— 1.4630 - 1.4690

or

Butyro refractometer reading at 40°C

— 55.6 - 64.8";

(iii) in standard No. 4, for the figures "189-202", the figures "189-195" shall be substituted;

(iv) standard No. 10, and the entries relating thereto shall be omitted;

(c) in item A.17.26,—

(i) standard No. 2, and the entries relating thereto shall be omitted;

(ii) for standard No. 3, and the entries relating thereto, the following shall be inserted, namely :—

"3. Refractive Index at 40°C

— 1.4630 - 1.4670

or

Butyro refractometer reading at 40°C

— 55.6 - 61.7";

(iii) in standard No. 4, for the figures "189-202", the figures "189-195" shall be substituted;

(iv) standard No. 10, and the entries relating thereto shall be omitted.

[F. No. P-15014/8/96-PH(Food)]

DEEPAK GUPTA, Jt. Secy.

419 New Indian standards

IS 11352: 1998 – Flexible pouches for the packing of Vanaspati upto 5 Kg or 5 Litres (second revision), Gr. 3.

{Standards India, 13(1), 1999, 22}

420 ISI mark on bottled mineral water to be mandatory soon

Branded mineral water will soon have to be packed and sold with the ISI mark on them as per the recommendations of the Central Committee of Food Standards. This comes in the wake of a comparative testing of bottled mineral water done recently by Voluntary Organisation in Interest of Consumer Education (VOICE), which showed that out of 12 brands tested only four qualified as 'mineral water' as per the Indian Standard (IS) specification. The brands were identified in a market research study covering the four metros. The brands tested were Himalayan, Fountain, Yes, Purette, Florida, Hello, Ganga, Bisleri, Golden Eagle, Prime, Aqua Natural Pura and Bailey. Each brand was put through 35 test parameters. The ones which qualified as mineral water according to the tests were Himalayan, Fountain, Yes and Purette. Brands on the threshold or close to be called mineral water were Florida, Hello and Ganga while the brands which did not meet the prescribed parameters were Bisleri, Golden Eagle, Prime, Aqua Natural Pura and Bailey. Labelling is most essential as it helps the consumer know what he is being served. Therefore, labelling observation had a weightage criteria of 5%. The specifications for packaged mineral water were: name of the product (natural or fortified mineral

water, name and address of the manufacturer, net weight or volume, batch number, month and year of manufacture and best before (w.e.f. 9.7.99), which most of the brands seem to comply with.

Apart from the above mentioned ones, additional requirements under Indian Standards 13428:1998 for labelling are not being followed by most brands. They are the location and name of the source of the mineral water, direction for storage and treatment for disinfection. The only positive sign seems to be that as per the recommendations of the Central Committee of Food Standards, mineral water has to be packed and sold with the ISI mark. The whole purpose behind the testing was to create more consumer awareness. "The idea is not to bring a revolution but to make the consumer realise what he is getting", the Secretary, Consumer Affairs, Mr.K.Srinivasan, said at the interactive session regarding water safety held at the Bureau of Indian Standards (BIS). India offers the biggest consumer market, and to meet the onslaught of MNCs, rules need to be amended.

{Business Line, 29 May 1999, 3}

NUTRITION AND HEALTH

421 Fiber ingredient in breakfast foods

A blend of fructooligosaccharides (FOS) fiber, derived from beets, and soy extract, enriched with potassium salts, has been recently introduced in the United States under the trade name *BeFlora*

Plus® for use as a functional ingredient in a variety of foods, including breakfast items. The product, which is made in France and sold in Europe under the trade name *Sucraflore®*, is manufactured by Groupe EPA Biotechnologie, Morlaix, France. The product will be made available to dietary supplement companies by Triarco Industries, Inc. Wayne, N.J., and to food companies by Chicago Sweeteners, Inc., Des Plaines, Ill. Major components of the formulation include FOS (50%), soy extract (47.5%) and potato starch. The FOS ingredient acts as a prebiotic to nurture or stimulate beneficial bacteria such as bifidobacteria and lactobacillus which can help maintain and stabilize intestinal flora. A balanced intestinal flora can provide improved regularity, stimulation of immune factors, production of digestive enzymes, and assistance in controlling the formation of free radicals.

The ingredient also offers a variety of functional properties. These include water retention, enhanced viscosity for improving binding and texture, stability at different temperature levels, and a stable pH. Available as a white powder, the product is instantly soluble in water and remains stable when cooked up to 525° F. It can be incorporated in a variety of foods, including pastries, biscuits, dairy products, confections, chocolate, fruit preparations, dietetic products, powdered drinks and herbal teas without an unpleasant aftertaste. Breakfast foods, in particular, may have exciting applications for the ingredient. Because current oligosaccharide intake is not sufficiently high to cause a desired bifidogenic effect, the incorporation of

prebiotics such as this product into high-intake breakfast foods such as cereals, biscuits and toaster pastries may become increasingly attractive. (*Food Technology*, 53(3), 1999, 62)

422 Poisonous fat

Roy Walford, a researcher who studies ageing at the University of California, Los Angeles, believes that yo-yo dieters repeatedly release toxic chemicals into their bloodstream. The rapid weight loss that happens when someone shifts to a calories restricted diet might have its dangers. In particular, toxic chemicals absorbed from the environment, but safety stored in fat, could be released into the blood. A single, successful diet is probably not too dangerous, Walford believes, as the exposure to stored toxic chemicals would be transient. (*New Scientist*, 30 January 1999, 13)

423 Eat bananas to avoid blood pressure

A banana or two a day keeps your blood pressure at bay, according to scientists who report that bananas can lower hypertension, offering a cheap alternative to drugs. A study on human volunteers by the Kasturba Medical College in Manipal showed a 10% fall in blood pressure in persons who consumed two bananas daily for a week. The studies followed successful experiments in rats that showed that ripe and unripe bananas have compounds that can lower blood pressure. These natural compounds act in a manner similar to anti-hypertensive drugs that are a multi-billion dollar industry today. Current drugs to lower high blood pressure are called "ACE inhibitors"- they inhibit the action of angiotensin

converting enzyme (ACE) that is responsible for forming a substance angiotensin-2 which constricts blood vessels and raises the pressure inside them.

The Manipal team studied six banana varieties and found that all had ACE-inhibiting properties, though the ACE-inhibiting action of ripened bananas was stronger than that of unripe bananas. The six varieties studied by the scientists included popular regional varieties *nendran*, *rasthali*, *poovan*, *robusta*, *bontha* and *safed velchi*. The studies indicated that the ACE inhibitors may be different from captopril, the drug which forms the backbone of anti-hypertensive drugs in the market today. The extract from *poovan* variety was not destroyed by heat and retained activity even after exposure to a temperature of 100 degrees celsius for 10 minutes. The unripe bananas are consumed as vegetables, this finding suggests that cooking may not destroy their beneficial properties. *{PTI Science Service, 18(4), 1999, 1}*

424 Wine may slow cancer cell growth

A study suggests that drink in moderation can be good for your health. A French study showed that polyphenol micronutrients abundant in wine, curbed proliferation of cancerous cells. A team from Montpellier University Hospital studied the effect of tannin polyphenols coming from grape skin and oak wine tubs – spinal cord cancer cell colonies, an example, “solid” tumor. “We found on the one hand the polyphenols; decreased the proliferation of cancerous cells; and on the other, that they had the effect of

inducing apoptosis – meaning they facilitate suicide of the cancer cells.” Rossi also cited studies conducted at the University of Heraklion in Greece as well as Marseille that both came to the same conclusion studying breast and prostate cancer cells – known as “liquid” tumors. In 1988, an American study suggested that the polyphenol resveratrol was effective in curbing tumor growth. These experiments seem to suggest that moderate wine consumption could help prevent cancer.

{PTI Science Service, 18(3), 1999, 14}

425 High doses of beta-carotene supplements linked to lung cancer

A study using ferrets shows that excess beta-carotene stored in the lungs becomes oxidized into products that lowered the levels of a tumour suppressor and increased those of a tumour promoter, says lead researcher Xiang-Dong Wang, an associate professor conducting research at US Department of Agriculture’s Human Nutrition Research Center on Aging at Tufts in Boston, Massachusetts. He claims that the metabolism of beta-carotene in ferrets is very much like that in humans and the results can explain two high-dose beta-carotene supplements may have increased lung cancer rates among smokers in two large intervention trials – the National Cancer Institute’s CARET study reported in 1996 and an earlier Finnish study reported in 1994. The ferrets were given the human equivalent of 30 mg of beta-carotene daily, the dose given in the CARET study. In contrast, the average beta-carotene intake from US diets is 2-5 mg a day and Americans are being encouraged to increase this to 8-10 mg

426 **Fruits that fight fat**

a day through their diets. This dose is considered to be safe in supplements too. One group of ferrets was given the beta-carotene supplements and exposed to cigarette smoke equivalent to a person smoking 1.5 packs a day daily for six months. Two other groups were given either the supplement or smoke exposure for the same length of time, while a control group received neither. The group receiving both treatments had the strongest pre-cancerous changes, says Wang. The products of genes that promote cell division were three-fold to four-fold higher in these animals than in the control group. Wang explains that body cells convert some of the beta-carotene into retinoic acid which suppresses cell division and is currently being used to treat skin cancer and leukaemia. But this system is disrupted when an excess of beta-carotene is exposed to the high oxygen levels in lung cells together with the oxidising effects of cigarette smoke. The oxidized beta-carotene metabolites destroy retinoic acid thereby decreasing tumour suppressing activity. Simultaneously, they raise levels of a protein that activates cell division. USDA Agricultural Research Service administrator Floyd Horn says that the findings emphasize the advantage of getting important nutrients through foods rather than through supplements. He points out that beta-carotene ingested in fruits and vegetables is completely safe - there are reports of harmful effects. Populations that eat more fruits and vegetables rich in beta-carotene and other carotenoids have a lower incidence of cancer, particularly lung cancer.

{Lipid Technology, 11(1), 1999, 4}

Watching one's weight is vastly important in today's world. Obesity is not just an aesthetic problem; it can lead to many health hazards too. It has been medically established that obese persons stand a greater risk of heart-related diseases than persons with normal weight. Thus, weight management and obesity treatments have attained considerable importance in medicine today. Recently there has been considerable interest in a natural product which, reportedly, reduces fat production in the body without side effects. The substance is '(-) Hydroxycitric Acid (HCA). It is a derivative of citric acid, but, unlike the prolifically available citric acid, (-) HCA occurs sparingly in nature. The main sources of HCA are *Garcinia cambogia deser* (Malabar Tamarind) and *Garcinia indica choisy* (Kokum). *G.cambogia* is seen abundantly in the evergreen forests of Konkan, stretching southwards to Kerala and the western Ghats. It is known as 'Kodampuli' in vernacular. *G.indica* mostly occurs in Maharashtra, Karnataka, West Bengal and Assam.

G.cambogia fruit is yellow or red when ripe, with 6-13 deep horizontal furrows. It has extremely sharp but pleasant acidity. Though edible, the fruit is rarely eaten raw, but many traditional recipes in Kerala use it for its distinct flavour. Kokum is a small deep purple fruit. In both the fruits the rind is separated from the kernel, sun-dried and preserved with common salt before they find their way to the markets. Both the fruits are listed in indigenous medicine as having high therapeutic value and are even now used as remedies for various diseases.

Potential users should understand that the effects of HCA depends on the amount ingested. A variety of HCA products are available in the market currently, in both the liquid form and as the salt of the acid. 'Citrin R' and 'Nature's Own' are popular products, which consist of the Calcium salt of (-) HCA. A typical recommended dosage of 250-500 mg after meals, 3 times a day.

{Science Express, 1 June 1999, 1}

427 Camel milk has therapeutic role in TB treatment

Camel milk has a therapeutic role in the treatment of tuberculosis (TB) in humans, say researchers who have found that it increases appetite and body weight, and helps improve body's immune system. A study on eight patients at the S P Medical college in Bikaner by scientists of the National Research Centre on Camel (NRCC) there, shows raw camel milk has a catalytic effect on the treatment of patients with TB and empyema – presence of pus in a membrane covering the lungs. The improvement in TB patients is probably due to higher content of lysosyme, an enzyme, in camel milk that inhibits the growth of bacteria, NRCC Director M S Sahani told. The patients were given standard treatment therapy along with camel milk at 1 litre/day. A control group was supplemented with dairy milk. Patients of TB as well empyema who were given camel milk showed increase in appetite which was the result of a 18% rise in haemoglobin – an iron-containing compound in blood that carries oxygen. Haemoglobin in TB patients usually decreases due to lack of appetite and loss of blood caused by frequent spitting.

Concentration of zinc, one of the trace elements in the body that helps in healing and maintaining normal functioning of the human immune system, also increased significantly in TB and empyema patients supplemented with camel milk. Pus formation in the empyema patients who were given camel milk reduced and their lungs showed greater expansion during breathing. Body weights of camel milk-fed patients showed an increase as compared to those in the control group. In the control group, empyema patients did not show any increase in body weight while the percentage increase in body weight of TB patients was quite less. Another blood parameter called Erythrocyte Sedimentation Rate (ESR), which increases in all chronic infections like TB, was also found to reduce considerably in both the patient types after they were fed with camel milk. White blood cell count, which generally increases in TB patients, too decreased after the camel milk diet.

{PTI Science Service, 18(12), 1999, 4}

428 Coffee reduces colon cancer

The protective effects of coffee against colorectal cancer risk is described. Prof. Giovannucci of Harvard Medical School suggests that coffee may accelerate the rate at which the colon expels waste and thereby limit colon cells exposure to potential carcinogens or that coffee contains anti-mutagenic components which inhibit the mutagenic effect of various micro-organisms, as the most likely explanations for lower risk of colorectal cancer among people who consume 4 or more cups of coffee a day.

{Planter's Chronicle, 95(3), 1999, 105}

429 Green tea affects cancer cells

Green tea contains substances that can kill tumour cells, which may explain why the drink, popular in Asia, seems to protect people from cancer. Green tea is much richer in these compounds than other kinds of tea, a team at Purdue University has found. Green tea leaves are rich in an anti-cancer compound, with concentrations high enough to induce anti-cancer effects in the body, Dorothy Morre, Professor of Food & Nutrition in the Purdue University said. She and her husband James Morre found green tea affects an enzyme known as NOX. Normal cells express the NOX enzyme only when they are dividing in response to growth hormone signals. In contrast, cancer cells have somehow gained the ability to express NOX activity at all times. This tumor associated NOX but not with normal NOX. "this is one of the first studies to directly link the ECG in green tea to anti-cancer activity", Morre said.

{PTI Science Service, 18(1), 1999, 13}

430 Link between fibre and colorectal cancer

Charles Fuchs (Harvard Medical School, Boston, MA, USA) and colleagues stratified dietary fibre intake into quintiles: women in the highest quintile had a median fibre intake of 24.9 g/day; in the lowest quintile fibre intake was 9.8 g/day. After adjusting for age, known risk factors, and total energy intake, there was no association between dietary fibre intake and colorectal-cancer risk. The relative risk for the highest quintile compared with the lowest was 0.95 (95% CI 0.73-1.25). The results

were also null for all subgroups examined, including division of the cohort by family history of colorectal cancer. No protective association was found for individual types of fibre. The protective effect of high dietary fibre against colorectal cancer was first suggested by Denis Burkitt, who noticed that Africans had a low incidence of the disease and a high fibre consumption. Several retrospective studies, possibly flawed by recall bias, have shown a link between low dietary fibre intake and increased colorectal cancer risk. Although this study examines only women, the 1994 Health Professionals follow-up study involved more than 47,000 men and also showed no protective effect from fibre.

{Lancet, 353(9150), 1999, 385}

431 Arecanuts linked to cancer, diabetes and asthma

Areca or betel nuts, an Asian delicacy chewed by more than 200 million people worldwide, can increase the risk of developing oral cancer, diabetes, heart disease and asthma. The small oval nuts are most commonly eaten in Southern Asian countries and are also popular among immigrant populations in the West. Their carcinogenic effects and link to a high incidence of oral cancer in the Indian subcontinent have been known for many years. "What is newly emerging is that there may be other health defects," said Saman Warnkulasuriya of King's College Hospital in London. "Consumption of areca has also been linked with cardiovascular disease, diabetes and asthma," he and his colleague Chetan Trivedy added. They also warned the nuts can be addictive. Eating nuts may be a safe and healthy habit.

However, recommendations encouraging frequent consumption should specify safe nuts and consider deleterious effects of some nuts such as areca.

(PTI Science Service, 18(10), 1999, 14)

432 Nut consumption linked to lower heart risk

In a study of approximately 86,000 women, Harvard School of Public Health researchers found the risk of major coronary heart disease was reduced by 35% for those who consumed at least five one-ounce servings of nuts per week, compared to those who rarely ate nuts. Results of the 14-year study shows that the coronary health benefits are associated with consumption of a variety of nuts, including walnuts and peanuts. Although nuts are high in fat, the fat is mostly unsaturated, which the researchers suggest can have a beneficial effect on blood lipids. In addition, most nuts are rich in arginine, the precursor to nitric oxide (a signaling molecule in the cardiovascular system), and also in alpha-linolenic acid. Peanut butter was only weakly associated with a decreased risk of coronary heart disease, something the researchers attribute to the use of hydrogenated fat in most U.S. brands.

Another Harvard Medical School study, with 22,000 men showed that as nut consumption increased, the risk of cardiac death decreased. Researchers proposed that the alpha-linolenic acid in nuts may reduce the risk of sudden cardiac death by preventing a fatal heart rhythm disturbance called ventricular fibrillation.

(INFORM, 10(3), 1999, 275)

433 Soy phospholipids may help memory loss

A soy-based supplement called *Leci-PS* has been developed which reportedly can help prevent or alleviate cognitive deterioration linked to aging. Research is showing that lecithin, a soybean oil by-product which has been used as an emulsifier, can aid in memory functions and heart health. Lecithin contains two important soy phospholipids: phosphatidylserine (PS), a brain nutrient that helps boost memory and improve concentration and learning, and phosphatidylcholine, a nutrient that helps protect the liver and aids in detoxification. Technology is now available to process these nutrients from lecithin, concentrate them and use them in nutritional supplements. soy phospholipids have potential as an ingredient in the formulation of cereals, candy bars and soft drinks. Manufacture of the PS-based supplement, Lucas Meyer, is making available an index of published clinical research on the effect of PS.

(Food Technology, 53(6), 1999, 144)

434 Blueberries having highest antioxidant capacity

Recent studies conducted at the Jean Mayer USDA Human Nutrition Research Centre on Aging at Tufts University ranked blueberries as having the highest antioxidant capacity of more than 40 tested commercially available fruits and vegetables. Antioxidants are natural substances found in fruits and vegetables which neutralize free radicals – unstable oxygen molecules associated with cancer, heart disease and the effects of aging. Scientists attribute these health benefits to

anthocyanins and other natural compounds found in wild blueberries. According to USDA, one-half cup of blueberries delivers as much antioxidant power as five servings of other fruits and vegetables, such as peas, carrots, apples, squash, and broccoli. Furthermore, like cranberries, blueberries may help promote urinary tract health". As a result of increased interest, the industry is actively working on new product development using blueberries as an ingredient. Potential products can include smoothies, breakfast cereals, salads, chutney and sauces. Wild blueberries, which are commercially harvested in Maine and Eastern Canada, are available year-round in a variety of forms, including frozen, dried, canned and concentrated.

{Food Technology, 53(6), 1999, 158}

435 Guiding the elderly to good nutrition

Scientists have developed a new food order specifically for people over 70, whose nutritional needs are often lacking.

- ◆ Calcium, Vitamin D, Vitamin B-12 supplements
- ◆ Fats, oils and sweets use sparingly
- ◆ Milk, yoghurt and cheese – 2 servings; meat, poultry, fish, dry, beans, eggs and nuts – 2 or more servings
- ◆ Vegetables – 2 or more servings; fruit – 2 or more servings
- ◆ Bread, cereal, rice and pasta – 8 or more servings
- ◆ Water – 8 servings

{The Times of India, 31 March 1999, 17}

436 Egg consumption and risk of heart disease

An epidemiological study conducted by leading researchers at Harvard School of Public Health found that "an egg per day is unlikely to have substantial overall impact on the risk of coronary heart disease or stroke among healthy men and women." The association between egg consumption and CHD among approximately 120,000 adult men and women was examined. The researchers contend that while reduction in egg consumption has been widely recommended by the American Heart Association and other health agencies as an effective means of lowering blood cholesterol levels, large population-based studies on egg consumption and risk of CHD have been, until now, sparse. According to representatives from the American Egg Board, the important study helps strengthen and step up its ongoing efforts to change current dietary guidelines that limit egg consumption.

{Food Technology, 53(6), 1999, 160}

437 Chicory fibers may increase body's calcium absorption

Recent research has shown that oligofructose (FOS) extracted from chicory root, when added to the diet, significantly increases the absorption of calcium by the body. Although certain fibers in the diet are known to bind materials in the digestive tract and prevent their absorption, new studies indicate that chicory oligofructose, although it is a dietary fiber, has just the opposite effect. Numerous rat studies have confirmed that this ingredient stimulates the absorption of minerals, specifically calcium and magnesium.

The use of different rat models showed an increase in the absorption of these minerals at the level of the large intestine, as well as an increased calcium uptake into the bone tissue, resulting in improved bone mineral density and bone trabecular structure. Human studies have confirmed the results seen in rat model studies- that consumption of chicory fructans by humans resulted in increased calcium absorption. Two feeding studies showed significantly positive effects, with increases in calcium absorption of 26-58%, depending on the dosage of the chicory fructan consumed.

{Food Technology, 53(6), 1999, 164}

438 Anti-diabetic herb

Diabetes may find a better alternative to painful insulin injections with researchers in Calcutta establishing that a widely available Indian herb can bring down blood sugar levels significantly. Biometric researchers at the Indian Statistical Institute (ISI) in Calcutta have found that leaf extracts of the herb *Gymnema sylvestre*, commonly called "meshoshringi", can bring down blood glucose levels by almost half. Working for over two years now on laboratory mice, scientists T K Basu and Bithin Maji had been trying to conduct a systematic probe into the active principles of this plant extract to develop a hypoglycaemic drug. "We found that when administered with the leaf extracts in various concentrations, mice fed with excess of glucose showed upto 50% decrease in glucose levels,". Similarly, glucose levels in another set of mice, artificially made hyperglycaemic through adrenalin injections, also went down by 45% after administration of the herbal extract.

The team is currently studying the effects of the extract on mice fed with another known hyperglycaemic drug streptozotocin. "We are yet to record any significant decrease of blood sugar levels with the herb on mice injected with streptozotocin," Basu says adding its mechanism of action is also being elucidated. Having established the working dose and definite hypoglycemic activities of *G. Sylvestre*, the team is attempting to observe the fractionation of the extracts to determine the number of chemical constituents present. Basu says after all the properties of the herb are defined, the team will try to develop marketable drug for diabetes.

{PTI Science Service, 18(7), 1999,3}

439 Health foods for diabetics and heart patients

Mysore-based Mistura Health Foods has launched 100% natural health foods for people suffering from diabetes and blood pressure in Chennai. Mistura Mascot is sugar free and good for those suffering from diabetes, while Mistura Mylant available in chocolate, almond and dry fruit flavours is good for heart patients and those having cholesterol. Hospitals in Mysore and in Chennai (Madras Medical foundation and Apollo) have certified the beneficial effects on patients. According to Managing Director V S Rao all these foods though classified as health foods were very palatable. Infants could also be given these foods but it had to be boiled first before administering it to them. These products have a shelf life of six months after opening and three years otherwise.

{Financial Express, 2 May 1999, 3}

440 Daily iodine requirement

Age	Iodine requirement (micrograms)
0-12 months of age (infants)	50
2-6 years of age (children)	90
7-12 years (elder children)	120
Above 12 years of age (adult)	150
Pregnant woman/lactating mothers	200

{Science Express, 13 April 1999, 2}

441 Make it decaf if there's a baby on the way

Women who drink coffee shortly before giving birth could be increasing the risk of their child developing epilepsy, according to researchers at Port Royal Hospital in Paris. Yehezkel Ben-Ari and his colleagues removed part of the brain called the hippocampus from newborn rats. The hippocampus can be the site of violent bursts of electrical activity that occur during epileptic seizures. When the brain cells were deprived of oxygen for a few minutes- which can happen during birth - their normal waves of electrical activity stopped, only returning when the oxygen supply was restored. But in the presence of caffeine at concentrations that could result from drinking two cups of coffee, depriving the cells of oxygen produced the intense electrical bursts typical of epileptic seizures. Pregnancy increases the half-life of caffeine in the blood from 2 to 20 hours, and the drug easily enters fetal brain. There it blocks the action of adenosine, which usually prevents seizures by suppressing electrical

activity in the hippocampus when the cells are starved of oxygen. Newborn infants need regular patterns of electrical activity in the brain to establish the right connections among nerve cells after birth. Seizures can result in the wrong connections being made, and oxygen deprivation during birth can lead to chronic epilepsy. The results suggest that caffeine may increase the risk of this happening, if a fetus is starved of oxygen at birth.

{New Scientist, 162(2192), 1999, 12}

442 Margarine -like spread to beat cholesterol

A margarine-like spread that promises to help consumers in the battle against cholesterol will hit most US grocery stores. The product "Take control" includes a natural soybean extract that helps lower cholesterol, said Lipton, Vice-President, Research & Development, David Blanchard, whose company makes the spread. He said the US Food & Drug Administration reviewed the product and gave the company permission to claim that eating the spread helps, promote healthy cholesterol.

{The Economic Times, 4 May 1999, 16}

443 Goodness Guava

Guava is the cheapest local fruit available in almost all seasons. It is a rich source of pectin (fibre), vitamin C, calcium, phosphorous, carotene, etc. Experiments are still on to know the exact nature of guava and its role in bringing down glucose and alcohol levels. It has been observed that after consuming guava for 3 months (one fruit a day) the serum cholesterol level in patients is reduced from 275.50 mg/100 ml to 220.35 mg/100 ml. Likewise, the blood glucose

level also reduced from 126.62 mg/100 ml to 112.0 mg/100 ml. Hence guava plays an incomparable role in controlling both glucose and cholesterol level. Traditionally, it was believed that guava prevents constipation and provides satiety value. The seedless variety can be given to the elderly to ease digestion process. It has also been proved that along with the diabetic or hypertensive diet one guava per day keeps the diabetologist away.

(Science Express, 1 June 1999,4)

444 Vitamin E protects heart

Vitamin E can inhibit an enzyme that promotes cholesterol plaque formation. This could explain why the vitamin protects against heart disease. High doses of vitamin E seem to reduce the risk of heart disease. Because vitamin E is an anti-oxidant many researchers suspected that it reduces the risk by preventing oxidation of cholesterol. But recent studies have shown that the vitamin confers protection very quickly, suggesting it might also reduce inflammation. More evidence for this came in 1996, when a team lead by Ishwarlal, Jailal at the University of Texas, Dallas, showed that vitamin E supplements reduce levels of a protein called interleukin-1-beta. This protein provokes inflammation by making immune cells called monocytes stick to the lining of the arteries-another key step in the formation of plaques.

(New Scientist, 17 April 1999, 16)

445 Drink anything to save you from bladder cancer

By drinking more water or anything else one can lower the risk of bladder cancer. Men who drank at

least eight glasses a day of all liquids reduce their risk of two common types of bladder cancer by half, when compared with men who drank 5 glasses or less, the study found. No one is certain why drinking more liquid helps prevent the transitional cell cancers. But some researchers believe the bladder lining suffers less exposure to cancer causing substances in urine, when the urine is diluted and urination is more frequent. This study is the first to demonstrate a clear link between increased liquid intake and decreased bladder cancer of the two types most commonly found in developed countries – papillary and flat transitional cell carcinomas.

(New Indian Express, 9 May 1999,17)

446 Amla can reduce cholesterol

Fruits of the Indian gooseberry, popularly known as amla, can reduce cholesterol levels by more than two-thirds, studies in animals have shown. Studies in Rajasthan have shown that amla or *Emblica officinalis* fruit pulp extract, when fed to rabbits with high lipid levels, had beneficial effect. The blood cholesterol levels declined by 67.5% and low density lipoprotein (LDL), which is linked to the serious arterial disease atherosclerosis, by 75.3%. Cholesterol and fat levels in the liver decreased significantly after two months of administration of the extract, a report by Ritu Mathur and Arthi Sharma from MDS University at Ajmer and V.P. Dixit from RR Government College at Alwar, said.

(PTI Science Service, 18(6), 1999,4)

447 Tea is good for the heart

Howard Sesso (Brigham and Women's Hospital, Boston, MA, USA) and colleagues investigated the coffee and tea drinking habits of 340 men and women who had heart attacks and those of a match group of healthy people. The researchers report no association between coffee drinking and myocardial infarction, but say that the heart attack risk in people drinking one or more cups of tea per day was about half that of tea "teetotallars". Tea may be beneficial because it contains flavonoids which reduce platelet aggregation and inhibit LDL -cholesterol oxidation.

{Lancet, 353 (9150), 1999,385}

448 Therapeutic aspect of tea

Polyphenol compounds present in tea could prevent the onset and subsequent progression of a variety of illnesses including cancer and coronary heart diseases, the two major causes of death around the world, according to Dr. Hasan Mukhtar, Prof. and Research Director in the Department of Dermatology of the Ohio based Case Western Reserve University.

{Planter's Chronicle, 95(3), 1999, 135}.

449 New benefit for coffee drinkers

A new study concludes that women who drink lots of fluid are less likely to suffer from kidney stones, especially if their intake includes coffee, tea or wine, the National Coffee Association of USA Inc. (NCA) said. The findings linked women who drank the daily 8 ounce of serving of caffeinated coffee with a 10% decrease in risk for kidney stones, while decaffeinated coffee

showed a 9% decrease and tea on 8% decline. Caffeinated coffee and wine were found to be significantly more effective than water in helping women avoid kidney stones. The researchers said caffeine may stop kidney stones from forming by increasing the flow of urine and decreasing its concentration. Conversely, a daily 8 ounce serving of grape juice was associated with 44% greater risk.

{Planter's Chronicle, 95(3), 1999, 135}.

450 A tomato a day will soon keep cholera away

A collaborative work, of institutions such as a Centre for Plant Molecular Biology at Delhi University, the Centre for Bio-technology, the National Institute of Immunology and IMTECH, Chandigarh, says that the tomato vaccine may reach consumers in the next year. The vaccine is getting ready to face toxicology trials on animals. Scientists working on this vaccine used special techniques to inject genetic materials which could produce substances to protect against the cholera organisms in the tomato. The genetic material gives the tomato a slightly blue colour. These substances, known as antigens, help the bodies defence mechanism in fighting the disease organisms. There are several advantages research vaccines: they are cost effective, they don't need a cold chain and they can easily reach every nook and corner of the country. They are easy to administer, as they can be consumed with the raw fruit.

{Times of India, 14 April 1999,1}

451 Boiled is the best

Cooked vegetables give you considerably more protection against

abundant in green vegetables such as spinach and broccoli. Other important carotenoids linked with health benefits are lutein, found in many yellow and green vegetables and lycopene, a constituent of tomatoes and water melons.

{New Scientist, 5 June 1999, 25}

NEW PERIODICALS

452 Food Ingredients Bulletin

Food Ingredients Bulletin, the unique ingredients focused newsletter (FIB) published by the Leatherhead Food RA, is now well established on our website (www.thefoodsite.com). Available only on a subscription basis, the 24 page publication spearheads a range of newsletters available on the site, and provides a comprehensive roundup of new and developments in the ingredients side.

{Food Manufacture, 74(5), 1999, 3}

FORTHCOMING CONFERENCES

EXPO 2000, a world exposition in Hanover, Germany is expected to attract 40 million visitors. It will also be the platform for an international academic forum for graduates and young researchers. More information is available with German Academic Exchange Service, DAAD 176, Golf Links, New Delhi -110 003. Email: daadnd@del2.vsnl.net.in or info@shaping-the-future.de.

Chocolate Technology Congress 2000 All companies working in the area of chocolate and related fields are encouraged to propose written

suggestions to the Zentralfachschule der Deutschen Subwarenwirtschaft (ZDS) planners. The following subject areas will receive special focus: modern chocolate technology; sustainable cocoa production; practical and legal effects of the QUID (quantitative ingredient declaration) rules; quality, quality assurance and processing control; alternative fats for the processing of chocolate; chocolate as an ingredient in other food stuffs.

January 13-15, 2000 Fruit Logistica 2000, fruit and vegetable marketing, Berlin, Germany. Contact: New Zealand German Business Association, Monique Surges. Email: msurges@nzgermanbiz-ahk.co.nz.

January 19-21, 2000 6th European Conference, Food-Industry and Statistics at Pau, France. Email: agrostat@univ-pau.fr and web: www.unit-pau.fr/agrostat.

January 23-26, 2000 North West Food Processors' Association 86th Food Convention and Expo at OR Convention Centre, Portland. Theme of the convention is, Success in a changing market place. About 3500 people will attend and 600 exhibits of the latest innovations in food processing, machinery, supplies and services will be exhibited.

January 27-29, 2000 World Spice Congress at Mumbai, India. Contact: organising secretary, World Spice Congress 2000, Spices Board, P.B.No. 2277, Cochin - 682 025. Email: spicesboard@vsnl.com. web: www.indianspices.com.

30 January - 3 February, 2000 International Sweets and Biscuits Fair, Cologne, Germany. Contact:

agrostat@univ-pau.fr and web: www.unit-pau.fr/agrostat.

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30 January - 3 February, 2000 International Sweets and Biscuits Fair, Cologne, Germany. Contact: Messe Reps and Travel, Robert Lainge.

31 January - February 2, 2000 - California League of Food Processors, Annual Expo and Showcase of Processed Foods, Sacramento Convention Center, Sacramento, CA.

February 1 - 7, 2000 ENIMACH 2000 3rd International Engineering Machinery & Machine Tools Exhibition is scheduled to be held at the Satellite Ground, Ahmedabad, Gujarat. For further information contact: K & D Communication Ltd, 4th Floor, Chinubhai House, 7-B Amrut Baug Society, P O Navjivan, Ahmedabad, Gujarat 380 014. Email: kandd@wilnetonline.net.

February 2, 2000 California Canning Peach Association, Annual Meeting, DoubleTree Hotel, Sacramento, CA.

February 7-13, 2000 23rd IFU-Fruit Juice Symposium 2000, "Fruit Juices from Tropical and Subtropical Countries." Havana, Cuba. Contact: Waknine & Berezovsky Co., Ltd., 36 Magal St., Savyon, Israel. Email: wb-il@inter.net.il.

February 9-11, 2000 Millennium International Conference on Renewable Energy Technologies at Indian Institute of Technology, Chennai. The conference aims to cover some interested topics like active solar thermal and photovoltaic technologies (status, upgradation and large-scale commercialisation), wind power technology (recent trends, operational and maintenance issues), biomass (potential, utilisation technologies and techno-commercial aspects), integrated renewable energy systems (perspectives and issues), RET for energy conservation, RET for food processing industries, RET and rural poverty alleviation, environmental aspects of RET, policies, financing and commercialisation of RET, case studies and success stories in RET.

For further information contact: Dr.C.Palaniappan, organising secretary, Millennium International Conference on Renewable Energy Technologies, Planters Energy Network, 171/2, M.K.University Road, Rajambadi, Madurai-625 021. Email: pen@vsnl.com or pen@md3.vsnl.net.in.

February 14-18, 2000 Cakes 2000, The Institute of Grain and Food Processing, Moscow, Russia. Contact: Dr. Vladimir Dashevkiy, The Institute of Grain and Food Processing. Email: igforp@dol.ru.

Exhibition and Conference at Pragati Maidan, New Delhi. The Exhibition is supported by EUROMAP (European Committee of Machinery Manufacturers for the Plastics and Rubber Industry) and others. Contact: Plastindia Foundation, 2, Leela Apartments, 355, S.V.Road, Vile Parle (W), Mumbai - 400 056. Email: plastind@viasbm01.vsnl.net.in and web: www.plastindia.org.

February 21-23, 2000 - Midwest Food Processors Association, Agri Safety and Processing Crops Conference, La Crosse Centre, La Crosse, WI.

February 26-29, 2000 Mefex 2000, 11th Middle East Food Hotel and Catering Exhibition, Bahrain Exhibition Centre. Contact: Overseas Exhibition Services Ltd., 11, Manchester Square, London W1M5AB, United Kingdom. Email: food@montnet.com; web: www.montnet.com.

February 28- March 2, 2000 Intergastra 2000, Catering and Confectionery, Stuttgart, Germany. Contact: New Zealand German Business Association, Monique Surges. Email: msurges@nzgermanbiz-ahk.co.nz.

February 29- March 2, 2000 Functional Food 2000, a three-day conference, exhibition and awards event devoted to the functional foods sector will be held in the Netherlands Congress Centre in Den Haag. Conference papers are invited in two key areas: functional ingredients that have been developed to address a specific health issue and case studies that discuss the development or launch of a retail functional food product.

February 29 - March 11, 2000 Ice Cream 2000 . Russia's 1st International Ice Cream Conference with the Russian Federation Ministry of Agriculture and foodstuffs taking the lead in organizing the show. Conference topics will range from raw materials and ingredients to product range and quality, equipment and technology, standardization and certification, packaging, customs regulation, transport and distribution, sales and marketing. Table top exhibits will be part of the show, which will be held at the Institute of Grain and Food Processing Industries in downtown Moscow.

Contact: The Institute at Pervyi Shchipovsky per. 20, Moscow 113093, Russia. Email: igrfop@dol.ru.

March 2-4, 2000 Refrigerated Foods Association, 20th Annual Conference & Exhibition, Westin-St. Francis, San Francisco, CA.

March 3-5, 2000 Coffee Fest, Atlantic City, Convention Centre.

March 5-8, 2000 American Frozen Food Inst., Western Frozen Food Convention, San Diego, CA.

March 7-8, 2000 Mid-America Food Processors Association, Annual Convention, Grand Wayne Center, Ft. Wayne, IN.

March 7-10, 2000 FOODEX Japan 2000, Nippon Convention Centre (Makuhari Messe), Japan Management Association Tokyo, Japan.

March 9-12, 2000 89th Annual Convention of the National Coffee Association of USA, Disney Grand

March 2-4, 2000 Refrigerated Foods Association, 20th Annual Conference & Exhibition, Westin-St. Francis, San Francisco, CA.

March 3-5, 2000 Coffee Fest, Atlantic City, Convention Centre.

March 5-8, 2000 American Frozen Food Inst., Western Frozen Food Convention, San Diego, CA.

March 7-8, 2000 Mid-America Food Processors Association, Annual Convention, Grand Wayne Center, Ft. Wayne, IN.

March 7-10, 2000 FOODEX Japan 2000, Nippon Convention Centre (Makuhari Messe), Japan Management Association Tokyo, Japan.

March 9-12, 2000 89th Annual Convention of the National Coffee Association of USA, Disney Grand Floridian Resort & Spa, Orlando, Florida. Email: mangerman@ncausa.org.

March 12-16, 2000 2nd International Symposium on Food Rheology and Structure, Zurich, Switzerland. Contact: Institute of Food Science Laboratory of Food Process Engineering. Email: secretary@isfrs.ethz.ch. web: www.isfrs.ethz.ch.

March 13-16, 2000 Cheese Ripening and Technology, Banff, Canada. Contact: Dr. Paul Jelen, Department of Agricultural, Food and Nutritional Science, University of Alberta, Canada. Email: pielen@afns.ualberta.ca.

March 15-18, 2000 Annual Meeting of the National Institute of Oilseed

Products, Westin la Paloma, Tucson, Arizona. Contact: NIOF, 1101, 15th St. NW, Suite 202, Washington, DC 20005. Email: niop@assnhq.com.

March 16-17, 2000 Sanitarium International Nutrition Symposium at Sydney, Australia. Covers areas such as: original diet versus modern diet, evidence based nutrition, super foods and health promotion and eco friendly eating.

March 19-21, 2000 IMR Food Hydrocolloid Conference: Hydrocolloids in a globalizing food market will be held at San Diego, USA. Contact: Dennis Seisun, PO Box 28993, San Diego, CA 92198-0993, USA. Email: dseisun@hydrocolloid.com.

March 21-23, 2000 Brew Drink Tech Asia, 3rd International Brewing Beverage Equipment, Singapore International Convention Centre.

March 25-28, 2000 Snack Food Association, SNAXPO 2000, Philadelphia Convention Centre, Philadelphia, PA.

March 26-31, 2000 Postharvest 2000, 4th International Conference on Postharvest Science, PO Box 500006, Tel Aviv 61500, Israel. Email: postharvest@kenes.com and web: www.agri.gov.il/events/postharvest2000.html.

March 27-29, 2000 Starch 2000, Cambridge, UK. Contact: Mrs. M.A. Staff, Cavendish Laboratory, Madingley Road, Cambridge CB3 0HE, UK. Email: mas32@phy.cam.ac.uk.

March 26-28, 2000 International Jelly and Preserve Association, Annual Meeting, Wigwam, Litchfield Park, AZ.

March 28-29, 2000 Mid-Atlantic & Virginia Food Processors Association's Joint Convention, Omni Hotel, Charlottesville, VA.

March 28-29, 2000 Ozark food Processors Association, Annual Convention, Holiday Inn Convention Center. Springdale, AK.

March 28-31, 2000 PFP Expo: Sino-Pack, China Drinktec and Sino-Food 2000, China Foreign Trade Centre, Guangzhou, China, Adsale Exhibition Services, Hong Kong.

SPECIAL ARTICLE

Soybean - the miracle golden bean

Soybean is hailed as the Miracle Golden Bean of the 20th century and it is rightly praised as treasure trove of many nutrients. It has highest protein content among the plant products. Soy contains 40% protein. Soy protein is rich in lysine, which is deficient in cereals, but is somewhat deficient in the sulphur-bearing amino acids that are contained in adequate quantities in cereals. When soy protein and cereal protein combined in appropriate proportions, the nutritional value of the product approaches that of casein. Soybean contains 20 % fat and it has number of poly unsaturated fatty acids, which are anti-cholesteric. The oil mainly contains long chain fatty acids such as linoleic, oleic and linolenic acids which are good for health.

The soybean has 35% carbohydrate with major portion being polysaccharides. The galactosaccharides such as raffinose, stachyose and verbascose present in soybeans are also known as flatus factors. The soybean has 5% minerals and also the richest known source of isoflavones. It is well known that there are some anti-nutritional factors in soybean, as in other pulses. These are protease inhibitors (8.1 to 38.5 TUI/mg), haemagglutinins 3%, saponins 0.5%, goitrogens and phenolic compounds. However, most of these anti-nutritional factors are heat labile and can be eliminated by suitable heat treatments.

PROCESSING OF SOYBEAN

The Department of Food & Nutrition, Faculty of Home Science, Acharya N.G. Ranga Agricultural University (ANGRAU) conducted extensive research on processing and utilization of soybean. Appropriate heat treatments during processing greatly improves the nutritional value of soybean. A study conducted on making soybeans completely free from the inhibitor with simple device and inexpensive methods of heat treatment which can be adopted at home level revealed that pressure cooking or 3 minutes of puffing in sand at 250°C or 12 minutes of roasting at 85 to 90 °C or boiling the beans for 20 minutes was found sufficient for complete inactivation of trypsin inhibitors.

UTILIZATION OF SOYBEAN

The functional properties of soy proteins like emulsification, gelation, viscosity, adhesion, cohesion, elasticity and aeration have contributed to the development of variety of processed foods like simulated meats, baked foods,

['Food Digest' acknowledges the authors Dr. Vijaya Khader and her colleagues, of the Centre of Advanced Studies, Hyderabad and Sri. Harsh Maheshwari, Editor SOPA Digest, for their permission to reproduce their articles]

macaroni, sausages, soups etc., in the developed countries by utilizing around 70 per cent of soybean produce in world. In recent times soy foods such as *soy milk, soy paneer, soy cheese* and *meat substitutes like Mealmaker, Nuggets* etc., find a good place in Indian market, but beyond the reach of common people due to higher prices. However, soydhal, soyflour and also the edible defatted soyflour can be easily used to prepare traditional recipes, baked foods, roti blends, fermented products, supplementary foods and therapeutic foods.

TASTY TRADITIONAL RECIPES

Several traditional recipes like *Wheat roti, Sorghum roti, Poori Pesarattu, Laddu, Mysorepak, Pakodi, Muruku, Sev, Vada* and *Chutney powder* were developed by adding soydhal/ soyflour to cereal or pulse flours at 50 % level. All these recipes were found acceptable through sensory evaluation trials. The addition of soy flour increased Protein Efficiency Ratio (PER) of the recipes. Though there was no change in Net Protein Utilization (NPU) values, a significant decrease in digestibility was observed after soy incorporation. However, the Digestibility of *Sorghum root* and biscuits were better when soyflour was added at 3:2 proportion than in 1:1 proportion.

A variety of baked products like *cake, biscuits, cookies, melting moments* etc., were developed by adding soyflour to maida. Consumer evaluation trails were carried out by selling the sorghum-soy biscuits by name SOJO biscuits through super markets in Hyderabad. The taste and texture of these biscuits were found to be highly acceptable.

FERMENTED PRODUCTS WITH SOYBEAN

In general the germination and fermentation improves the nutritive value of products. They play an additional role in case of soybean products by destroying the inhibitors and improving the flavour, texture and quality. The fermented products like *Tofu* and *Tempeh* are famous in several other countries. The fermented products namely *fermented soymilk drink, Shoyu* and germinated soybean bread have been developed and their protein quality assessed. Germinated soy bread was prepared by adding 15 per cent of germinated soy flour to maida flour. The ingredients used were Maida – 136g; Soy flour – 24 g; Sugar – 16g; Salt – 3g; Yeast – 6g; Dalda – 6.0g and Water – 100 ml. The ingredients were mixed and baked at 285 °C for seven minutes. Addition of soyflour has advantages of shorter fermentation time and less mixing of the dough when compared to the normal bread.

INFANT FOODS WITH SOYBEAN

Low cost foods namely *Rice-soy, Wheat-soy, Suji-soy* and *Sorghum-soy* infant foods have been formulated by using cereal and defatted soyflour in 70:25 ratio. The processing methods used were roasting the ingredients at 85 °C. These infant foods contained 370 to 380 Kcal of energy and 13 to 14 per cent protein and were highly accepted by pre-school children. The average values of PER, DC and NPU was 2.2, 94.4 and 82.9 respectively. These foods can be safely stored for 3

months at household conditions. The effect of supplementation of these foods was studied in low income children. The body weights and arm circumference of children increased significantly after supplementation and the difference was significant between experimental and control groups.

"PUSHTI" - A SUSTAINABLE SUPPLEMENTARY FOOD

A high density and low cost supplementary food PUSHTI was formulated with popped wheat, roasted defatted soyflour and sugar and further fortified with vitamins and minerals. Pushti has 377 Kcal of energy and 13 g of protein per 100 g. The calorie density, viscosity, proximate composition, Digestibility Coefficient (DC) and Net Protein Utilization (NPU) of Pushti was comparable with commercial supplementary food 'Cerelac'. Pushti stored in 67 micron polyethylene (LPDE) packing has a shelf life of seven months. Pushti was sold through rural fair price shops at 50 per cent subsidy for a period of nine months. Majority of parents showed willingness to buy the food at subsidised price. Supplementation through Public Distribution System (PDS) has resulted in a significant decrease in the incidence of grade III malnutrition from 9.1% to 2.6%. There was a significant decrease in the incidence of 'wasting' and less pronounced effect was observed in the prevalence of 'stunting'. Sale of subsidised supplementary foods through PDS was found to be a viable alternative for providing food and nutrient security to the pre-school children of low income groups.

SOYBEAN AND HUMAN HEALTH

DAILY CONSUMPTION OF SOY

Science has not yet established a recommended daily amount of soy to be consumed for positive health benefits. In many cases, however, just one serving of soy per day may help improve health. Soyfoods are a nutritional powerhouse providing many essential nutrients that the body needs daily, such as protein, fiber and minerals.

Nutritive content of soyfoods

Table I

Food	Calories	Protein (grams)	Carbohydra- te (grams)	Fat (grams)	Saturated fat (grams)
Soybeans ½ cup, cooked	149	14.3	8.5	7.7	1.1
Tempe ½ cup	165	15.7	14.1	6.4	1.1
Textured soy protein ½ cup, cooked	59	11	7	0.2	fat free
Soynuts ¼ cup	202	15	14.5	10.0	1.6
Tofu ½ cup	94	10	2.3	5.9	0.9
Soy flour, defatted ¼ cup	81.7	12.8	8.4	0.3	0.02
Soy milk, plain 1 cup	79	6.6	4.3	4.6	0.5

Table II

Nutritive content of soyfoods

Food	Naicin mg	B 6 mg	Folic Acid ug	Calcium mg	Iron mg	Magne- sium mg	Copper mg	Zinc mg
Soybean ½ cup cooked	1.35	.20	47	88	4.42	74	0.35	1.1.99
Tempeh ½ cup	3.8	.25	43	77	1.9	58	0.55	1.11.5
Textured soy protein ½ cup cooked	0.75	.12	-	85	2	86	0.32	Fat free 1.37
Soynuts ¼ cup	.6	.09	91	59	1.65	63	0.35	1.61.35
Tofu ½ cup	0.2	.06	19	130	-	127	0.24	0.91.00
Soy flour defatted ¼ cup	0.65	.14	76	60	2.3	72	1	.02.61
Soy milk, plain one cup	1.4	.10	4	10	1.38	45	0.288	0.5.54
Miso 2 tbsp	0.3	-	10.1	23	.95	14.5	0.15	1
Adult Recomm- ended Daily Allowance	15	1.6- 2.0	180- 200	800	10 - 15	280 - 350	1.5 - 3.0	12-15

Talk soy home page/about the USB/soy information, products and receipes soy and human health/search talk soy

SOY AND PROTEIN

Soybeans are exceptionally high in protein. 35 to 38 percent of the calories in soybeans come from protein. Other beans are about 20 to 30 percent protein. Equally important is the quality of the protein; its suitability to human physiological needs. Soy protein is of the highest quality, equal to that of meat and milk products. Soy protein isolates are a highly digestible source of amino acids. Amino acids are the building blocks of protein, essential for human growth and maintenance. Protein, once consumed, is broken down into individual amino acids which form helpful antibodies and enzymes for our bodies. Of the 20 amino acids humans require, 11 are produced by our bodies. The remaining nine must come from the foods we eat. Soy protein provides all nine missing amino acids, making it a complete protein. The soybean is the only vegetable offering a complete protein profile.

SOY AND FIBER

All whole plant foods contain dietary fiber. A fiber-rich diet is very important to reduce the risk of certain types of cancer and heart disease. The National Cancer Institute recommends that Americans consume 25 to 30 grams of fiber a day. Most people fall far short of this goal. Soybeans and some soyfoods are an excellent fiber source: one quarter-cup of soybeans provides eight grams of fiber. Foods made from the whole soybean, such as soy flour, textured soy protein and tempeh, are also fiber-rich. Some soyfoods lose their fiber in processing, however. Tofu and soy milk contain very little fiber.

SOY AND MINERALS

Many soyfoods are rich in calcium. A one-quarter-cup serving of soybeans contains 88 milligrams of calcium, which is about 10 percent of an adult's recommended daily intake.

SOY AND CALCIUM

Roasted soy nuts contain 232 milligrams of calcium per quarter-cup. Tofu is often made using a calcium salt and can contain between 120 and 750 milligrams of calcium in a ¼ cup serving. Other calcium-rich soyfoods include tempeh, textured vegetable protein and soy milk fortified with calcium. The calcium in soyfoods is readily absorbed by the body. Soyfoods are also a good source of the minerals copper and magnesium.

SOY AND ISOFLAVONES

Soybeans contain a variety of phytochemicals. But soybeans are the only food source with nutritionally significant amounts of one important phytochemical called isoflavones. In various experiments, isoflavones directly or indirectly have been found to lower cholesterol, inhibit bone resorption, relieve menopause symptoms and possess anticancer activity. Some research shows that just one serving of soyfoods – one cup of soymilk, or ½ cup of tofu – is sufficient to exert clinical effects. The two primary isoflavones in soybeans are daidzein and genistein and their respective

glucosides, genistin and daidzin. Soyfoods typically contain more genistein than daidzein, though this ratio varies. Isoflavones resemble estrogen in chemical structure; In fact, they are classified as weak estrogens. Isoflavones are found in soyfoods both with and without a sugar molecule attached. Raw, dry soybeans contain between two and four milligrams of isoflavones per gram. Most traditional soyfoods, such as tofu, soy milk, tempeh and miso, are rich sources of isoflavones providing about 30 and 40 milligrams per serving. Only two soy products, soy sauce and soybean oil, do not contain isoflavones.

Soy protein concentrates (65% soy protein) may or may not contain nutritionally significant amounts of isoflavones depending on how the product is processed. However, isoflavone levels in the most commonly used soy protein concentrates are very low. Both soy flour and textured soy protein are rich in isoflavones. Soy protein isolates (90% soy protein) contain less than these products but still have significant amounts. A group of soyfoods often referred to as "second-generation products" (such as soy hot dogs and soy-based ice cream) can have much lower amounts of isoflavones, because they may also contain considerable amounts of non-soy ingredients.

SOY & VITAMINS

Soyfoods contain a wide array of vitamins. They are especially rich in some of the B-vitamins, such as niacin, pyridoxine and folacin.

SOYBEAN IN THERAPEUTICS

Soybean has great potential in solving the problems of protein energy malnutrition. Soybean, a high protein and a low carbohydrate legume would be of great use in the formulation of therapeutic diets. Soy is an abundant, economical protein source and soy products offer numerous additional health benefits, from lowering risk of diabetes, heart diseases, cancer, osteoporosis and other chronic diseases to easing the symptoms of menopause.

SOYBEAN FOR DIABETICS

The glycemic response of soy incorporated (40%) recipes mainly *Roti*, *Upma*, *Dhokla* and *Chole* was assessed in normal subjects. The percent glycemic response of soy incorporated recipes was significantly higher than control recipes. Since *chole* was found to have the least glycemic response, this was tested in non-insulin dependent diabetic subjects. The glycemic response of the diabetic subjects with soy *chole* was lower than with Bengalgram *chole*.

SOYBEAN SAFEGUARDS THE CARDIO VASCULAR HEALTH

Natural soybean oil has highly unsaturated fatty acids and contains approximately 7% of omega-3 alfa linolenic fatty acids. Research indicated that omega-3-polyunsaturated fatty acids in the diet is beneficial to cardiac health. Generally populations that have higher intake of isoflavones have lower rates of cardio vascular disorders. The isoflavones present in soybean possess antioxidant

activity and there is evidence that several flavanoids can inhibit oxidative modification of Low Density Lipoprotein (LDL) and raises the high density lipoprotein (HDL) levels and thus reduces cardio vascular disorders.

SOYBEAN SAVES THE RISK OF CANCER

Soybeans are the richest known sources of isoflavones and they are also known as phytoestrogens. Depending on the biological environment and their chemical structures, phytoestrogens can function either as estrogens or as anti-estrogens. Due to their phenolic structure isoflavones have antioxidant property and may prevent conversion of pre-carcinogens to carcinogens. They possess antioxidant, anti-inflammatory, anti-proliferative and anti-estrogenic properties. They are reported to be responsible for reducing the risk of breast, prostate and colorectal cancer and also reduces bone density loss in women after menopause. It is estimated that the human beings would need to consume isoflavones at 1.5 to 2.0 mg/kg body weight per day to provide an 'anti-carcinogenic dose' of these compounds. This level of isoflavones intake could be met by consuming 120-360 g of several soy products.

SOY & BONE HEALTH

Osteoporosis is a problem of immense magnitude. In 1990, there were 1.66 million hip fractures worldwide, two-thirds of which were women. The United States has one of the highest rates of osteoporosis in the world: between 15 and 20 million Americans have osteoporosis.

Soyfoods can contribute to improved bone health in three ways:

- (i) Many soyfoods, such as tofu, fortified soy milk, tempeh, soybeans and textured vegetable protein are excellent sources of highly bioavailable calcium.
- (ii) Soy protein favorably affects calcium metabolism relative to other high quality proteins.
- (iii) Soybean isoflavones may directly inhibit bone resorption. Incorporating soyfoods into the diet is one easy way to help reduce risk of developing osteoporosis.

SOY & WOMEN

Women have a number of specific health concerns including breast cancer, osteoporosis and symptoms of menopause. All these conditions are related in varying extents to diet. Because soybeans contain phytoestrogens (also called isoflavones), which possess weak estrogen-like activity, there is increasing interest in the role that soyfoods can play in women's health. Soyfoods are rich in the isoflavone genistein, containing as much as one milligram per gram of soyfood (dry weight). Genistein has been shown to inhibit estrogen-dependent breast cancer cells in vitro. Like other isoflavones, genistein exhibits very weak estrogen activity. Because it is thought that weak estrogens compete with endogenously produced estrogen for

binding to estrogen receptors, they may act as antiestrogens and interfere with the growth of estrogen-dependent tumors. The consumption of just one serving of soyfoods (1/2 cup tofu, tempeh, soybeans or textured vegetable protein, or 1 cup soy milk) is associated with reduced cancer risk.

A study conducted by the Japanese Department of Public Health and Gifu University School of Medicine, of 60 Japanese women who consumed 400 milliliters of soymilk daily has revealed an average 27% decrease in blood estradio levels. The researchers attributed the beneficial results to the 109 milligrams of soy isoflavones contained in the daily soymilk consumption. The researchers claimed the isoflavone phytoestrogens genistein and daidzein compete with estradiol for binding to estrogen receptors, and may therefore interfere with estrogen-induced cellular proliferation leading to breast cancer. The study also found that the menstrual cycle of the women drinking the soymilk was increased by nearly two days, which may also lower the risk of breast cancer. The estrogenic activity of soybean isoflavones may help to offset the effects of reduced estrogen production by the ovaries. Women who consumed 45 grams of soy flour per day experienced a 40 percent decrease in menopause symptoms. A recent study found that soy consumption increased the length of the menstrual cycle by an average of 2.5 days. Soy consumption was also associated with a marked decrease in both follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels. The decrease in LH levels has lead to speculation that soy might interfere with ovulation.

Some non-food uses of soybean are outlined below:

i) Soy crayons

Soy crayons are made using pure soybean oil instead of the traditional petroleum wax. This produces brighter, smother colours with no waxy flaking. Plus, they are environmentally friendly and non-toxic.

ii) Soy diesel

Soy diesel consists of methyl-esterified soybean oil. It can be used in standard diesel engines without modifications. When burned, soy diesel provides similar engine performance, upto 30% fewer harmful omissions (such as particulates, hydrocarbons, etc.) and the odour of the exhaust resembles that of French fries |

iii) Premium building materials

A new product called "Environ" is produced using 45% soybean flour, 45% recycled newspaper and 10% other ingredients. This product has the appearance of granite and the physical properties of wood. It is currently being used in the construction of table-tops, lamps, in-laid flooring and awards.

iv) Household products

Bean-E-Clean, a soybean oil hand cleaner removes grease, tar and paint from hands and washable fabrics while still being gentle to the skin. Other new household products include car wax, multi-purpose cleaners and skin lotion.

v) Industrial solvents

Soybean oil based industrial solvents can be used to remove tar, oil, grease, adhesives, asphalt and oil-based paints from tools and equipment. Soybean oil solvents are non-toxic, biodegradable, non-corrosive and have a lower flash-point than petroleum based solvents. Believe it or not, the soy solvents are also useful in shoreline clean-up after a crude oil spill.

vi) Asphalt & concrete release agents

Soybean oil based products are being used to spray the inside of asphalt trucks and concrete forms to facilitate release. Unlike traditional petroleum products, these agents are biodegradable, easily washed from clothing and more effective overall.

vii) Lubricants & hydraulic fluids

Soybean oil based lubricants and hydraulic fluids are technically superior to their petroleum based counterparts. When spilled, they pose no threat to the environment because they are completely biodegradable.

viii) Soy inks

Soybean oil has been used in printing inks and paints for many years. However, there are new superior products that are in wide use. Soy inks are sharper and create superior colour. When drying, they do not create harmful fumes as do the petroleum based inks.

ix) Soy adhesives

Soybeans are being used in adhesives for plywood products. Due to increasing lumber costs, wood manufacturers are making more products from waste materials, such as wood chips, dust and inferior cuts, therefore their demand for adhesives has risen.

x) Soy textile fibres

Textiles have been made from soybean fibres. These can be used for roadside netting for erosion control on landscape projects or for fishing nets. Researchers have also developed a product known as "soy silk" for use in clothing.

xi) Biodegradable plastic utensils

Soybean protein can be used to produce plastic eating utensils that will remain structurally-sound during use, but once discarded, will biodegrade (i.e. at a landfill site).

xii) Birthday candles

Once again, soy oil can be used to replace petroleum wax in a product. Soy candies, developed by three University students, are dripless and edible.

xiii) Turning soybeans into sneakers

Using soy protein appears to make polyurethane foam firmer and stronger than the way it is currently made. This foam could be used to make cooler insulation, foam chair stuffing, shoes and car bumpers.

Countrywise export of soybean meal from India

(Q=Quantity in '000 M.T., V=Value in Rs. Crores and UV=Unit Value in

COUNTRY	APRIL '98 TO OCTOBER '98			NOVEMBER '98			APRIL '98 TO NOVEMBER '98		
	Q	V	UV	Q	V	UV	Q	V	UV
FREE CURRENCY AREA COUNTRIES									
South Asia and Far East									
Bangladesh	7.857	5.72	7277	-	-	-	7.857	5.72	7277
China	28.595	18.97	6634	4.942	2.28	4622	33.537	21.26	6338
Hong Kong	26.339	16.18	6145	2.225	1.30	5832	28.564	17.48	6120
Indonesia	18.776	11.69	6225	4.365	2.32	5316	23.141	14.01	6054
Japan	27.575	26.69	9681	1.983	1.10	5525	29.559	27.79	9402
Malaysia	3.383	2.59	7652	1.070	0.63	5843	4.453	3.21	7218
Nepal	2.153	1.26	5871	1.897	1.00	5281	4.050	2.27	5595
Pakistan	6.475	4.39	6775	3.611	19.57	4200	10.086	23.96	23755
Philippines	2.495	1.40	5623	-	-	-	2.495	1.40	5623
Singapore	60.100	39.18	6519	24.302	12.43	5114	84.402	51.61	6115
South Korea	0.331	0.28	8483	0.500	0.27	5388	0.831	0.55	6621
Sri Lanka	2.966	2.15	7260	-	-	-	2.966	2.15	7260
Taiwan	3.726	2.13	5742	0.045	0.05	10976	3.771	2.19	5804
Thailand	1.228	0.74	6005	-	-	-	1.228	0.74	6005
Vietnam	9.391	7.97	8491	2.966	1.67	5619	12.357	9.64	7802
SUB TOTAL	201.39	141.34		47.906	42.62		249.297	183.98	
Middle East									
Jordan	20.097	13.34	6639	2.022	1.19	5896	22.119	14.53	6571
Kuwait	19.843	14.48	7299	1.490	0.82	5529	21.333	15.31	7176
Oman	3.289	2.57	7813	-	-	-	3.289	2.57	7813
Saudi Arabia	0.955	0.63	6589	-	-	-	0.955	0.63	6589
U.A.E.	0.200	0.16	7917	-	-	-	0.200	0.16	7917
SUB TOTAL	44.384	31.18		3.512	2.01		47.896	33.20	

SOPA

COUNTRY	APRIL '98 TO OCTOBER '98			NOVEMBER '98			APRIL '98 TO NOVEMBER '98		
	Q	V	UV	Q	V	UV	Q	V	UV
Other Countries									
Colombia	-	-	-	2.286	1.42	6221	2.286	1.42	6221
Mauritius	0.509	0.36	7155	-	-	-	0.509	0.36	7155
New Zealand	0.016	0.02	13712	-	-	-	0.016	0.02	13712
SUB TOTAL	0.525	0.38		2.286	1.42		2.811	1.80	
G. TOTAL	246.301	172.94		53.704	46.05		300.005	218.98	

- Note :-**
- i) All figures based on information received from members till 21st January, 1999.
 - ii) Totals may not add due to rounding

(Reprinted in edited form from 'Food and Nutrition News', 4(1), 1999 and SOPA Digest, December 1998)

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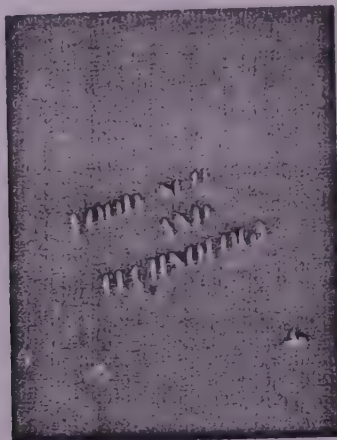
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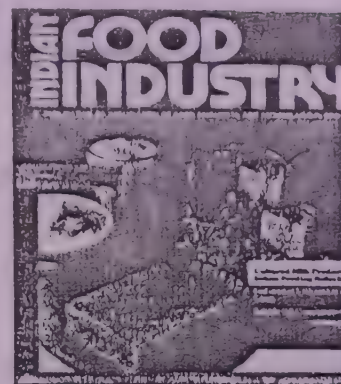
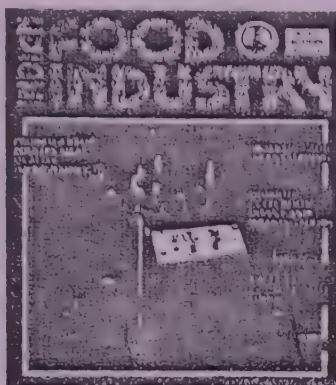
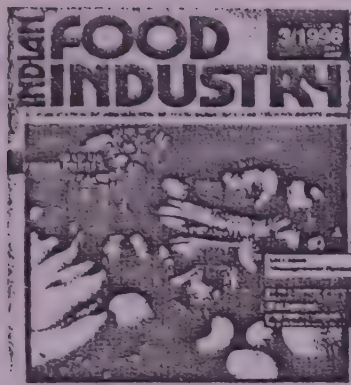
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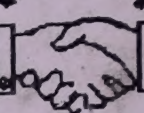
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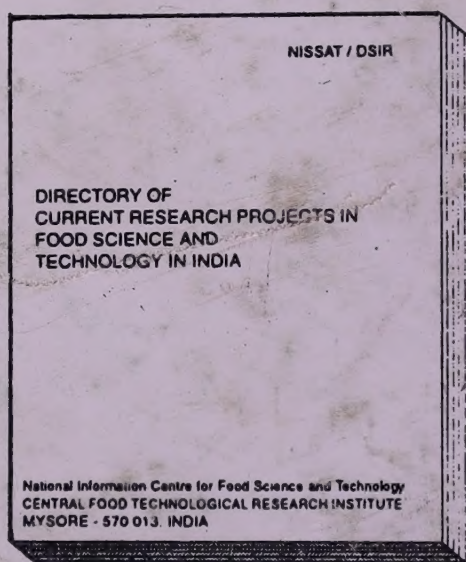
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